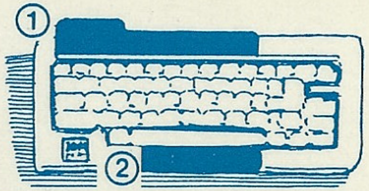

② ▶

Fn B	Ctrl D	Ctrl F	Ctrl U	Fn →	Fn ←
STOP	DOWN	FLIP	UP	PREVIOUS SCREEN	NEXT SCREEN

LOGOWriter™ For the IBM®PCjr™ ◀①

Fn 1	Fn 2	Fn 3	Fn 4	Fn 6	Fn 8	Fn 9	Fn 0
SELECT	CUT	COPY	PASTE	ERASE TO END OF LINE	LABEL	TURTLE-MOVE	HELP

② ▶

Fn B	Ctrl D	Ctrl F	Ctrl U	Fn →	Fn ←
STOP	DOWN	FLIP	UP	PREVIOUS SCREEN	NEXT SCREEN

LOGOWriter™ For the IBM®PCjr™ ◀①

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Fn 1	Fn 2	Fn 3	Fn 4	Fn 6	Fn 8	Fn 9	Fn 0
SELECT	CUT	COPY	PASTE	ERASE TO END OF LINE	LABEL	TURTLE-MOVE	HELP

② ▶

Fn B	Ctrl D	Ctrl F	Ctrl U	Fn →	Fn ←
STOP	DOWN	FLIP	UP	PREVIOUS SCREEN	NEXT SCREEN

LOGOWriter™ For the IBM®PCjr™ ◀①

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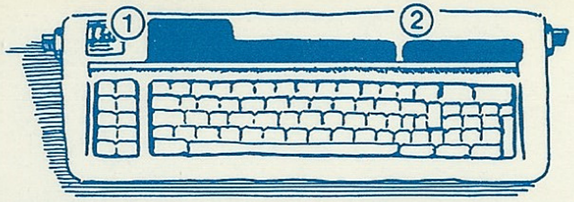
Fn 1	Fn 2	Fn 3	Fn 4	Fn 6	Fn 8	Fn 9	Fn 0
SELECT	CUT	COPY	PASTE	ERASE TO END OF LINE	LABEL	TURTLE-MOVE	HELP



② ▶

Ctrl-Break	Ctrl-D	Ctrl-F	Ctrl-U	Pg Up	Pg Dn
STOP	DOWN	FLIP	UP	PREVIOUS SCREEN	NEXT SCREEN

LOGO Writer™

For the IBM®PC ◀①

F1	F2	F3	F4	F6	F8	F9	F10
SELECT	CUT	COPY	PASTE	ERASE TO END OF LINE	LABEL	TURTLE-MOVE	HELP

② ▶

Ctrl-Break	Ctrl-D	Ctrl-F	Ctrl-U	Pg Up	Pg Dn
STOP	DOWN	FLIP	UP	PREVIOUS SCREEN	NEXT SCREEN

LOGO Writer™

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F1	F2	F3	F4	F6	F8	F9	F10
SELECT	CUT	COPY	PASTE	ERASE TO END OF LINE	LABEL	TURTLE-MOVE	HELP

② ▶

Ctrl-Break	Ctrl-D	Ctrl-F	Ctrl-U	Pg Up	Pg Dn
STOP	DOWN	FLIP	UP	PREVIOUS SCREEN	NEXT SCREEN

LOGO Writer™

For the IBM®PC ◀①

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F1	F2	F3	F4	F6	F8	F9	F10
SELECT	CUT	COPY	PASTE	ERASE TO END OF LINE	LABEL	TURTLE-MOVE	HELP

②

② ▶

C= S	C= D	C= F	C= U	C= ←	C= CRSR→
STOP	DOWN	FLIP	UP	PREVIOUS SCREEN	NEXT SCREEN

LOGOWriter™ For the COMMODORE 64® ◀ ①

C= 1	C= 2	C= 3	C= 4	C= 6	C= 8	C= 9	C= 0	f 1
SELECT	CUT	COPY	PASTE	ERASE TO END OF LINE	LABEL	TURTLE-MOVE	HELP	ESCAPE

② ▶

C= S	C= D	C= F	C= U	C= ←	C= CRSR→
STOP	DOWN	FLIP	UP	PREVIOUS SCREEN	NEXT SCREEN

LOGOWriter™ For the COMMODORE 64® ◀ ①

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C= 1	C= 2	C= 3	C= 4	C= 6	C= 8	C= 9	C= 0	f 1
SELECT	CUT	COPY	PASTE	ERASE TO END OF LINE	LABEL	TURTLE-MOVE	HELP	ESCAPE

② ▶

C= S	C= D	C= F	C= U	C= ←	C= CRSR→
STOP	DOWN	FLIP	UP	PREVIOUS SCREEN	NEXT SCREEN

LOGOWriter™ For the COMMODORE 64® ◀ ①

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C= 1	C= 2	C= 3	C= 4	C= 6	C= 8	C= 9	C= 0	f 1
SELECT	CUT	COPY	PASTE	ERASE TO END OF LINE	LABEL	TURTLE-MOVE	HELP	ESCAPE

② ▶

LOGO Writer™

For the Apple® IIe™ and IIc™ ◀ ①

S	D	F	U	←	→
STOP	DOWN	FLIP	UP	PREVIOUS SCREEN	NEXT SCREEN

1	2	3	4	6	8	9	0
SELECT	CUT	COPY	PASTE	ERASE TO END OF LINE	LABEL	TURTLE-MOVE	HELP

---

② ▶

LOGO Writer™

For the Apple® IIe™ and IIc™ ◀ ①

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 S STOP
 D DOWN
 F FLIP
 U UP
 ← PREVIOUS SCREEN
 → NEXT SCREEN

 1 SELECT
 2 CUT
 3 COPY
 4 PASTE
 6 ERASE TO END OF LINE
 8 LABEL
 9 TURTLE-MOVE
 0 HELP

---

② ▶

LOGO Writer™

For the Apple® IIe™ and IIc™ ◀ ①

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 S STOP
 D DOWN
 F FLIP
 U UP
 ← PREVIOUS SCREEN
 → NEXT SCREEN

 1 SELECT
 2 CUT
 3 COPY
 4 PASTE
 6 ERASE TO END OF LINE
 8 LABEL
 9 TURTLE-MOVE
 0 HELP

Booklet stickers for use
with the COMMODORE 64® Computer.

Booklet
On Your Mark, Get Set, Go! (p. 3) Green

Getting Started

1 Turn on the disk drive. Put the LogoWriter disk into the disk drive and close the door.

2 Turn on the monitor.

3 Turn on the computer. Type

```
LOAD"LOGO",8
```

This message will appear:

```
READY
```

Type:

```
RUN
```

4 After a few seconds, this is what you'll see: →

Booklet
You and Your Friends (p. 23) Red

```
to start
pu
setpos [-130 0]
seth 90
setc 4
end
```

Booklet
You and Your Friends (p. 26) Red

```
to check
if colorunder = 1 [stop]
if colorunder = 2
  [jumpback]
if colorunder = 3
  [jumpahead]
if colorunder = 6
  [pr [You win!!!] stop]
check
end
```

Tells it to stop

Jumps back.

Jumps ahead.

You win!

Check runs itself again.

Check is a recursive procedure. It contains two stop rules.

```
if colorunder = 6
  [pr [You Win!!]
stop]
```

This tells **check** to stop running if the color under the turtle is color 6.

```
if colorunder = 1
  [stop]
```

This tells **check** to stop running if the color under the turtle is color 1.

Printed in Canada

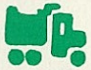
Drive a Truck

Turn the turtle:

```
rg
rt 90
```

Set it to the truck shape:

```
setsh 26
```



Can you make it move? Try:

```
pu
fd 50
```

Here's a trick to move the truck at a slower and steadier pace:

```
repeat 90 [fd 2]
```

Try different inputs for **repeat**:

```
repeat ⌴ [fd 2]
```

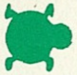
Means fill in any number.

Try different inputs for **fd**:

```
repeat 90 [fd ⌴]
```

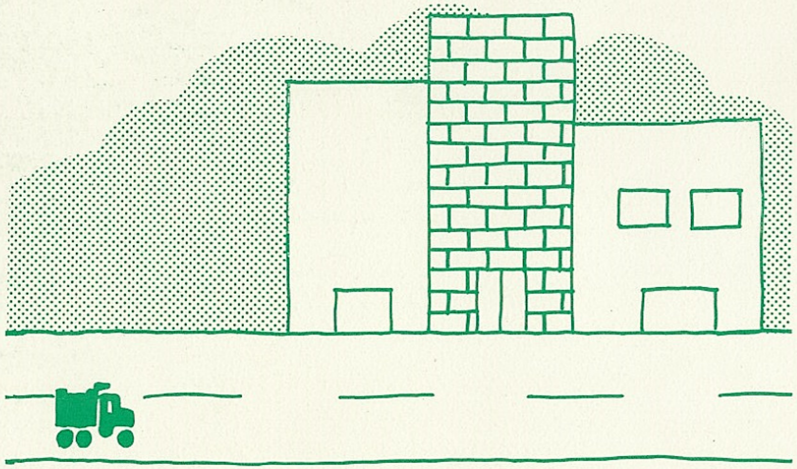
To get the regular turtle shape back:

```
setsh 0
```



Can you add the truck to a street scene?

Try these ideas



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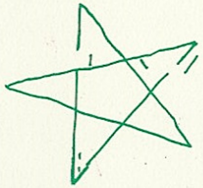
Printed in Canada.

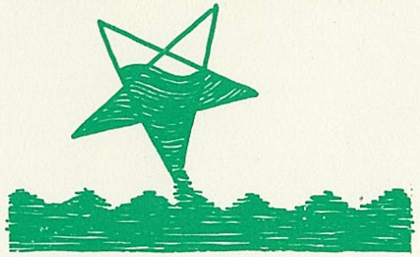
Fill Your Drawings With Color!



Draw a star:

```
rg
repeat 5 [fd 90 rt 144]
```

Make sure that the shape is closed. If there is a hole, the color will leak out and cover the page.



Color in the star with **fill**:

Press the **turtle-move** keys.

Move the turtle into the shape with the **arrow** keys.

ESC Press **Escape**.

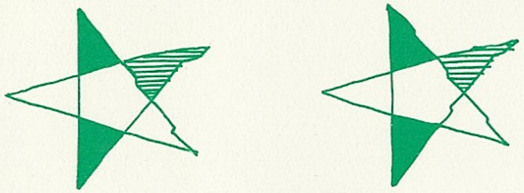
Type:

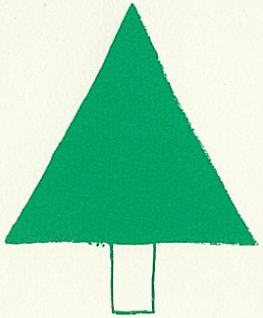
```
fill
```

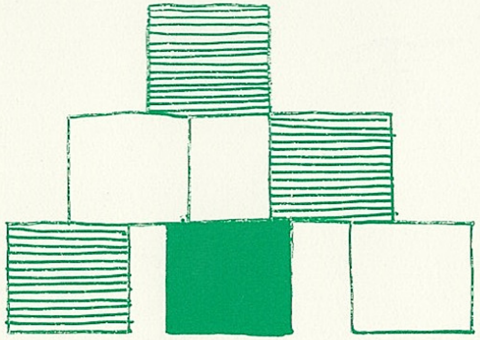
Move the turtle into another section. Change the color and fill again:

```
setc 2
fill
```

Try these ideas







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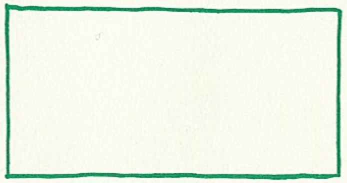
Shade is a command that fills an area with a pattern. The pattern is made up of the turtle's shape.

Try:

```
rg
shade
```

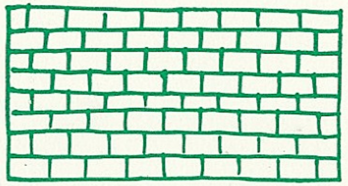
Make a brick wall.
First, draw the wall:

```
cg
repeat 2 [fd 50 rt 90 fd 80 rt 90]
```



Now fill the wall with bricks:

```
pu
rt 45
fd 10
pd
setsh 29
shade
```

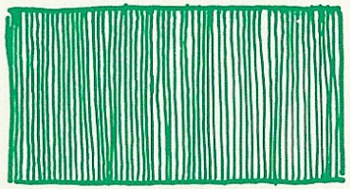


Shade in other patterns. Try stripes (**shape 30**):

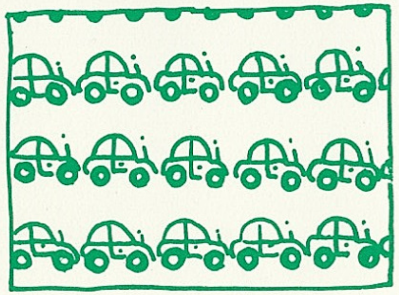
```
pu
home
pd
rt 90
repeat 2 [fd 50 rt 90 fd 80 rt 90]
```

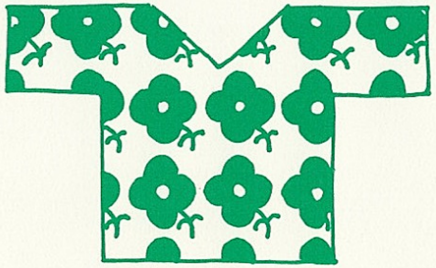
Move the turtle into the rectangle. Then type:

```
setsh 30
shade
ht
```



Try these ideas





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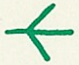
Tracks in the Sand

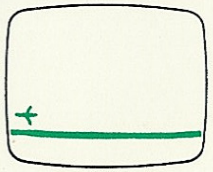
Try:

```
rg
setsh 13
pd
stamp
pu
fd 30
```

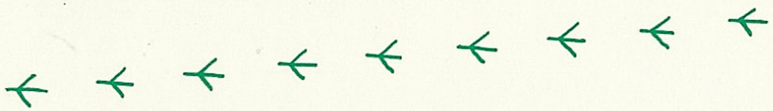


Make the bird tracks across the whole page. First, place the turtle at the left corner of the screen:

```
cg
pu
rt 60
bk 120
rt 20
```

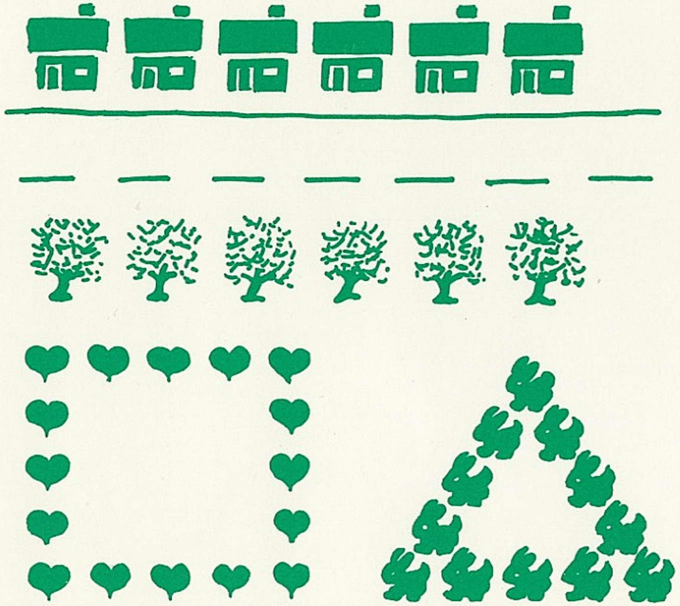


Use **repeat** to make the tracks:



```
repeat 8 [pd stamp pu fd 30]
```

Try these ideas



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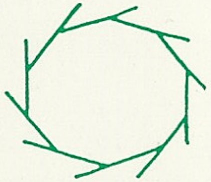


Can you make this picture? Try:

```
rg
repeat 10 [fd 50 bk 20 rt 36]
```

Times to repeat.

List of things to repeat.

The brackets are important. They go [around the list].

Change the times to repeat the list:

```
cg
repeat ⌴ [fd 50 bk 20 rt 36]
```

Change the distance the turtle moves forward or back:

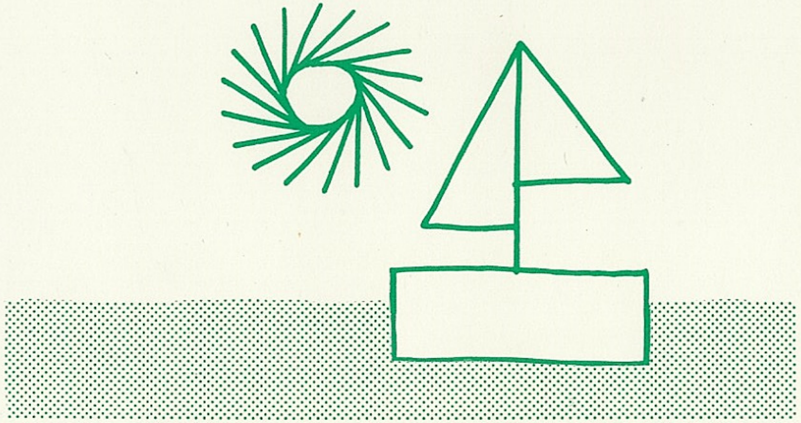
```
cg
repeat 10 [fd ⌴ bk 20 rt 36]
```

```
cg
repeat 10 [fd 50 bk ⌴ rt 36]
```

Change how much it turns:

```
cg
repeat 10 [fd 50 bk 20 rt ⌴]
```

Try these ideas



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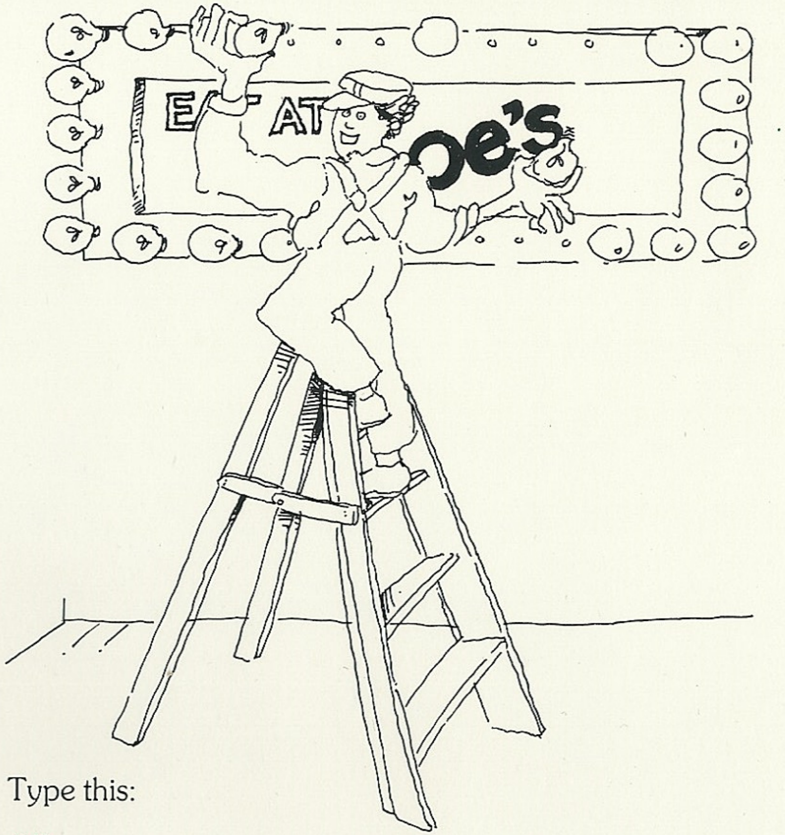
Flashing Sign



Type this:

```
rg
ht
label [hello]
```

hello is printed at the turtle's position.

Type it again:

```
label [hello]
```

hello is erased.

Try this:

```
repeat 11 [label [Eat at Joe's]]
```

brackets

If the message flashes too fast for you, add a **wait** inside the brackets:

```
repeat 11 [wait 10 label [Eat at Joe's]]
```

Try other numbers.

To add the flashing sign to a street scene or highway scene:

Press the **turtle-move** keys.

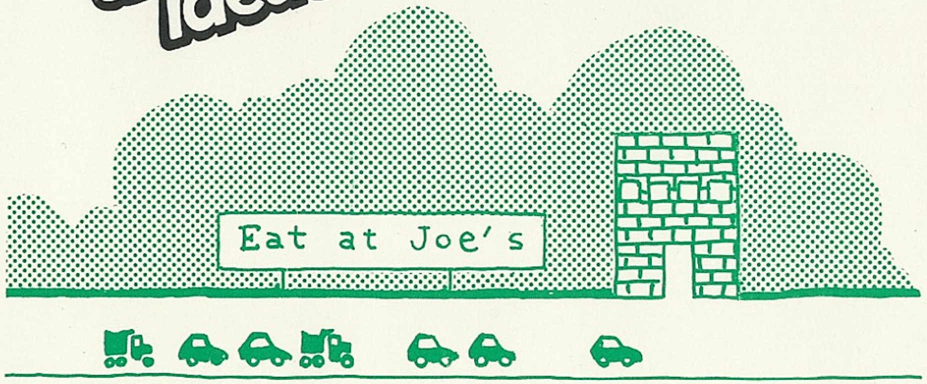
Use the **arrow** keys to place the turtle where you want your sign.

ESC Press **Escape**.

Draw a rectangular frame for the words.

Type the **repeat** instruction to flash the message.

Try these ideas



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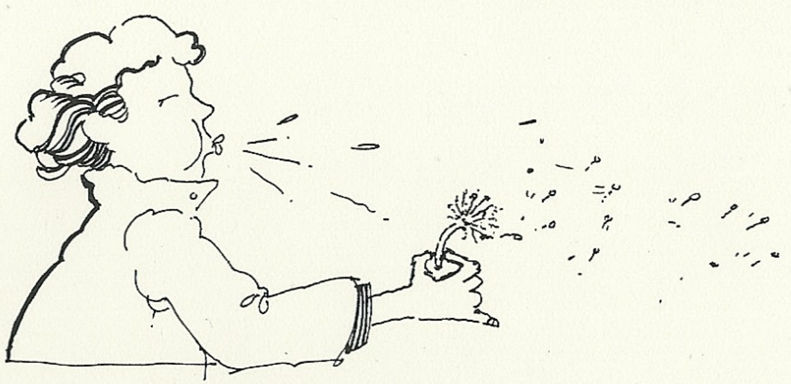
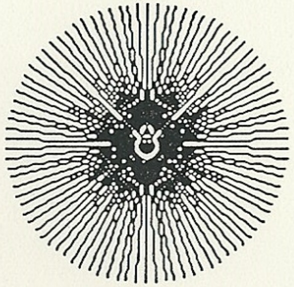
Dandelions





Draw a pattern that looks like a dandelion:

```
rg
repeat 90 [fd 75 bk 75 rt 4]
```

Change the color and make another one on top of it:

```
setc 3
repeat 90 [fd 75 bk 75 rt 4]
```

Draw a smaller dandelion:

```
cg
repeat 90 [fd 35 bk 35 rt 4]
```

You can make a field of dandelions!

Try changing the color of the background:

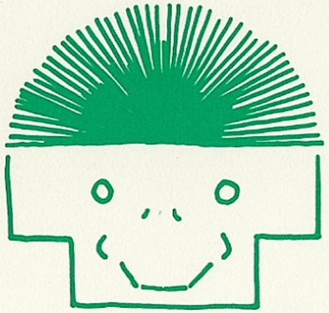
```
setbg 1
setbg 2
setbg 0         Sets the background back to black.
```

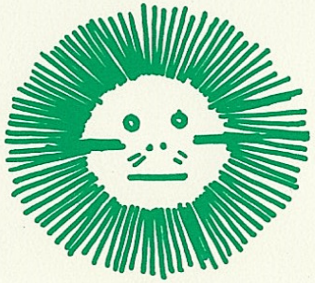
Try these ideas:

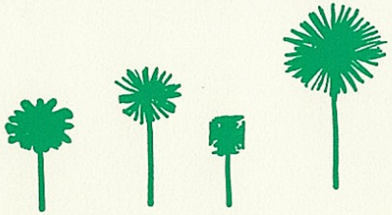
```
cg
repeat 90 [fd 75 bk 75 rt 4]
pe
repeat 90 [fd 35 bk 35 rt 4]

rg
repeat 90 [fd 75 bk 75 rt 4]
setc ␣          Choose a color you like.
repeat 90 [fd 35 bk 35 rt 4]
```

Try these ideas







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Bug Eyes

Draw a circle:

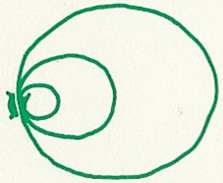
```
rg
repeat 36 [fd 10 rt 10]
```

Try making a smaller circle:

```
repeat 36 [fd 5 rt 10]
```

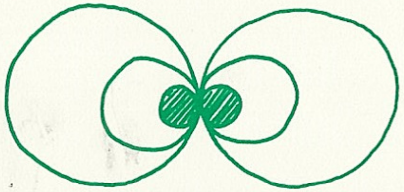
This input changes.

```
repeat 36 [fd 2 rt 10]
```



Draw a circle that goes to the left.

```
repeat 36 [fd 10 lt 10]
```



Make bug eyes like the ones in the picture.

Fill the eyes with color:

Press the **turtle-move** keys.

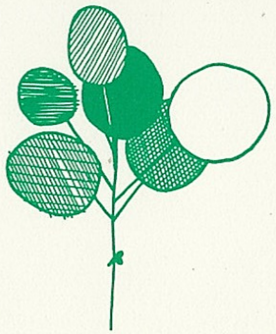
Use the **arrow** keys to place the turtle inside the circle.

ESC Press **Escape.**

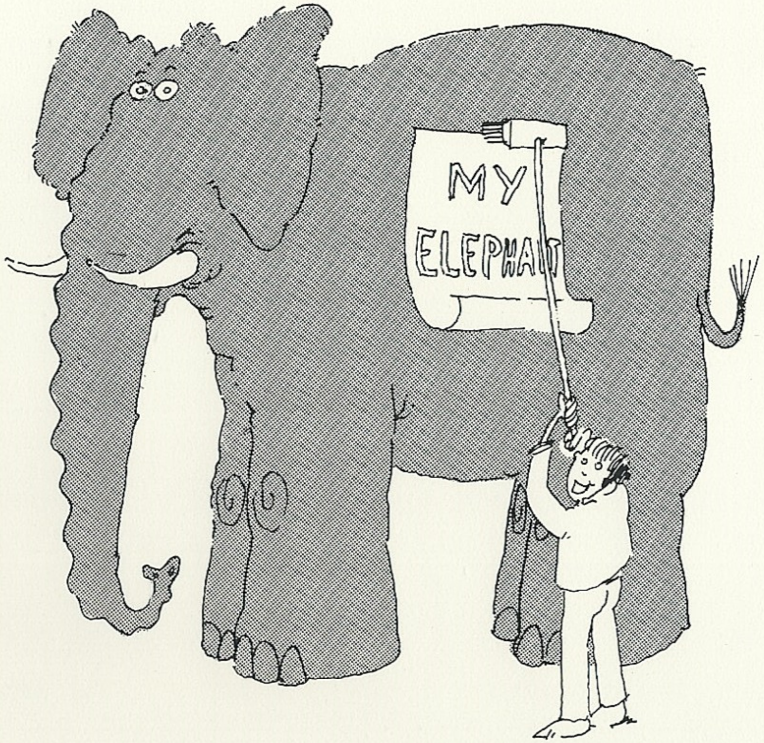
Type:

```
setc ␣        Choose a color you like.
fill
```

Try these ideas



ISBN 2-89371-004-2.
Printed in Canada.



Do you have a picture you'd like to label? Draw a picture, or choose a page with a picture on it.

Follow these steps to label your picture:

LABEL Press the **label** keys.

✥ Use the **arrow** keys to move the label cursor.

Type your label.

What do you do if you make a mistake? Here is an example:

✥ Use the **arrow** keys to put the cursor on the wrong letter:

hou$\boxed{\text{d}}$e

Type the same letter, (**d**), to make it disappear.

hou $\boxed{\text{e}}$

← Use the **back arrow** key to go back to the empty space.

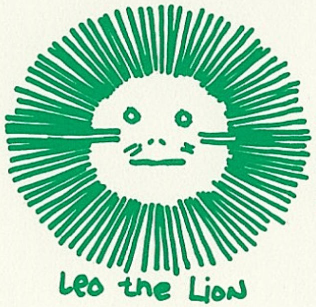
hou$\boxed{}$e

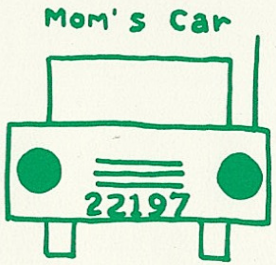
Type the letter you want.

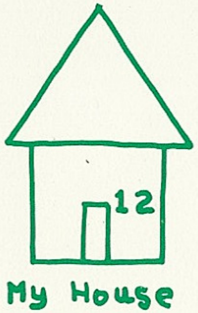
hous$\boxed{\text{e}}$

ESC Press **Escape**.

Try these ideas







ISBN 2-89371-004-2.
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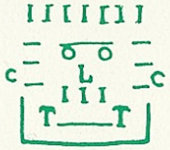
Draw the outline for a face.

Press the **label** keys.

Use the **arrow** keys to move the label cursor.

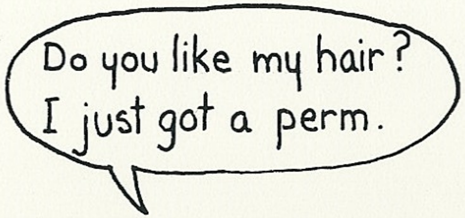
Use letters, numbers and punctuation marks to fill in the features – eyes, nose, mouth, hair, eyes and even freckles!

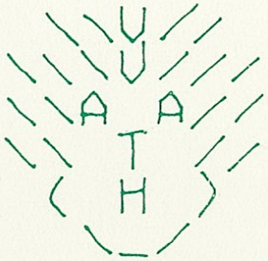


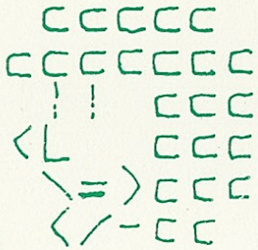
Press **Escape** when you've finished.

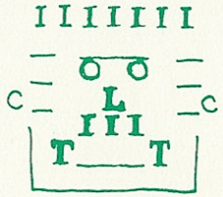
Try these ideas

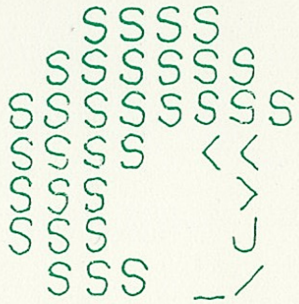
You can even make your characters "talk"!


Do you like my hair?
I just got a perm.









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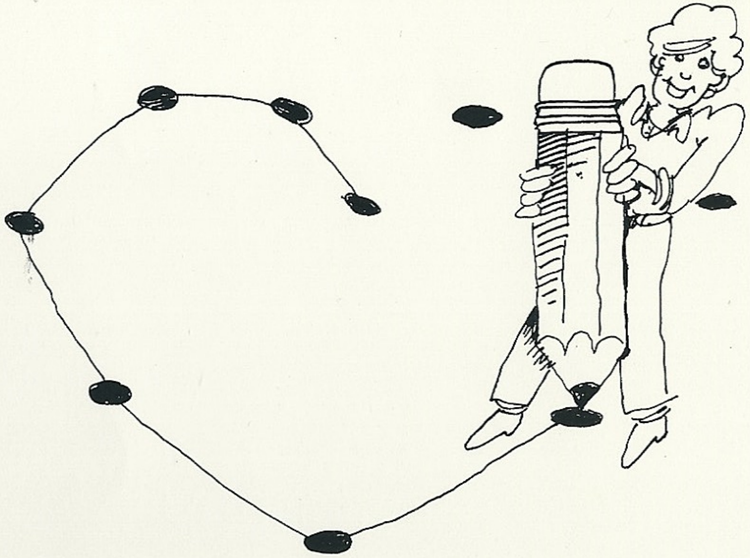
A Connect-the-Dots Puzzle



Make a connect-the-dots puzzle and print it out for your friends.

To put the dots and letters on the screen:

LABEL Press the **label** keys.

↑↓←→ Use the **arrow** keys to move the label cursor.

Type a period (.) to make each dot. Put one where the lines will connect.

Type in the letters. They show which dots to connect.

Type a name for your picture.

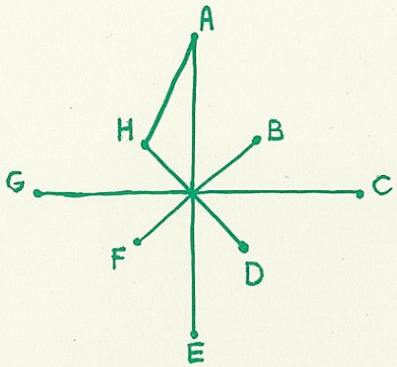
ESC Press **Escape**.

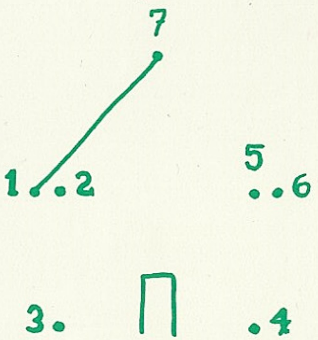
If you have a printer connected, you can print the puzzle on paper.

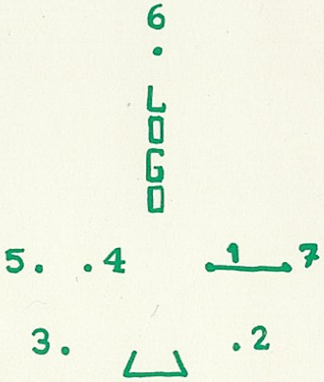
Type:

```
printscreen
```

Try these ideas







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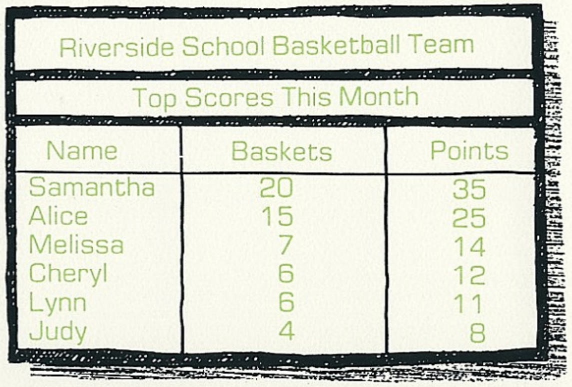
Score Sheet



Riverside School Basketball Team

Top Scores This Month

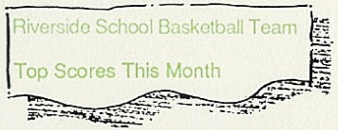
Name	Baskets	Points
Samantha	20	35
Alice	15	25
Melissa	7	14
Cheryl	6	12
Lynn	6	11
Judy	4	8

Use the **tab** key to print in columns.

Clear the page:

```
rg
ht
ct
```

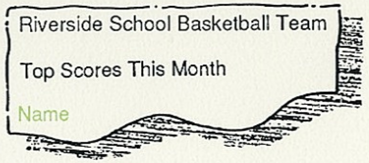
Press the **up** keys and type the title lines:



Riverside School Basketball Team

Top Scores This Month

Type Name, then press the **tab** key three times.

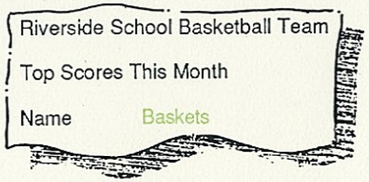


Riverside School Basketball Team

Top Scores This Month

Name

Type Baskets. Press the **tab** key two more times.

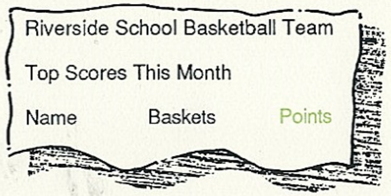


Riverside School Basketball Team

Top Scores This Month

Name Baskets

Type Points. Press **Return** **Enter** to start a new line.



Riverside School Basketball Team

Top Scores This Month

Name Baskets Points

Now type in the information. Use the **tab** key to line up the columns:

Type:

```
Samantha
```

Press the **tab** key twice.

Type:

```
Samantha          20
```

Press the **tab** key three times.

Type:

```
Samantha          20          35
```

Press **Return** **Enter**

You can print anything in columns:

Track results

Football scores

The temperature each day of the week

The results of a fund raising campaign

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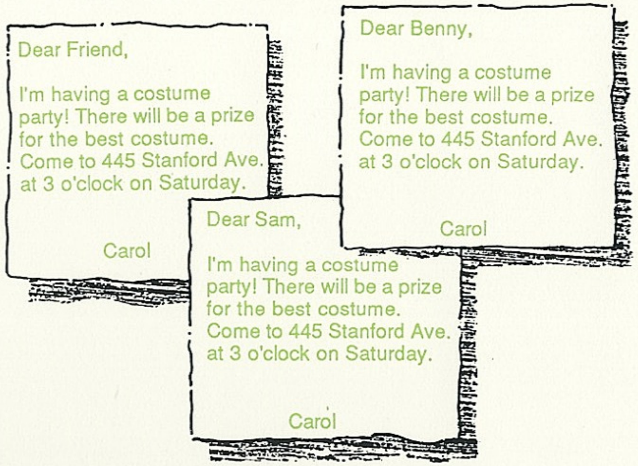


Dear Friend,

I'm having a costume party! There will be a prize for the best costume. Come to 445 Stanford Ave. at 3 o'clock on Saturday.

Carol

Dear Benny,

I'm having a costume party! There will be a prize for the best costume. Come to 445 Stanford Ave. at 3 o'clock on Saturday.

Carol

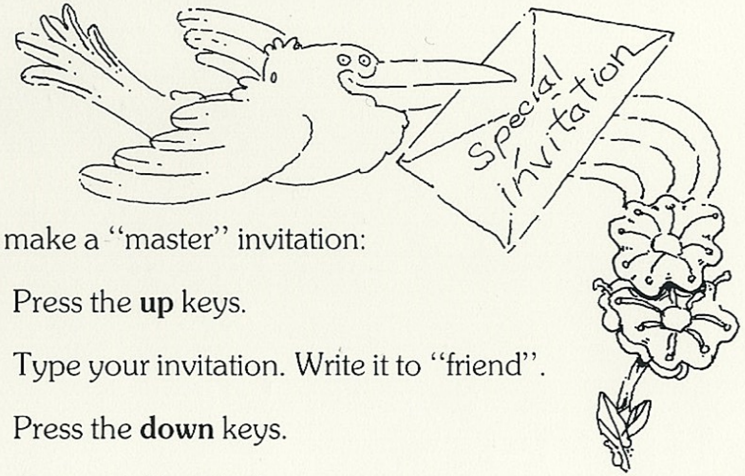
Dear Sam,

I'm having a costume party! There will be a prize for the best costume. Come to 445 Stanford Ave. at 3 o'clock on Saturday.

Carol

On paper, write down a list of the friends you want to invite:

Sam
Ben
Gina
.
.
.



Now make a "master" invitation:

Press the **up** keys.

Type your invitation. Write it to "friend".

Press the **down** keys.

Name the page "master":

```
namepage "master
```

ESC Press **Escape** to go to Contents.

Make lots of copies of the invitation:

Choose the master page from Contents.

Name the page after the first friend in your list:

```
namepage "sam
```

Use your friend's name.

Use **replace** to put your friend's name on the invitation:

```
top
```

Moves the cursor to the top of the page.

```
replace "friend "Sam
```

Use your friend's name.

Go back to the master page:

```
gp "master
```

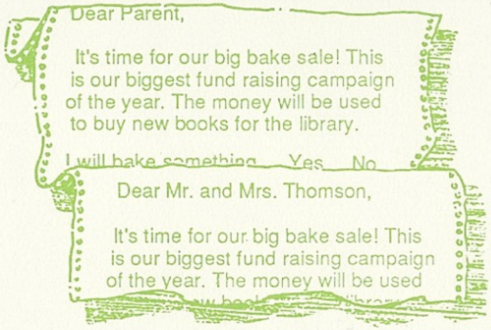
Follow these steps for each friend on your list.

To print out each invitation:

Choose the page from Contents.
Print the page:

```
printscreen
```

ESC Press **Escape** to go back to Contents.



Dear Parent,

It's time for our big bake sale! This is our biggest fund raising campaign of the year. The money will be used to buy new books for the library.

I will bake something ___ Yes ___ No

Dear Mr. and Mrs. Thomson,

It's time for our big bake sale! This is our biggest fund raising campaign of the year. The money will be used

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A Shortcut

Try this in the command center:

```
repeat 4 [bk 30 rt 90 fd 50]
```

Here's a shortcut for defining a procedure using that instruction.

First, copy the line:

Move the cursor to the beginning of the line:

```
repeat 4 [bk 30 rt 90 fd 50]
```

Press the **select** keys.

With the **arrow** keys, select the whole line:

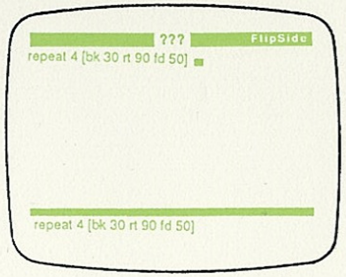
```
repeat 4 [bk 30 rt 90 fd 50]
```

Press the **copy** keys.

Next, go to the flip side of the page and paste the line:

Press the **flip** keys.

Press the **paste** keys.



```
repeat 4 [bk 30 rt 90 fd 50]
```

```
repeat 4 [bk 30 rt 90 fd 50]
```

```
repeat 4 [bk 30 rt 90 fd 50]□
```

Use the **back arrow** key to move the cursor to the beginning of the line.

Press Return Enter to open a new line.

Place the cursor on the blank line.

Type **to**, then type the name you want for the new procedure:

```
to pattern□
repeat 4 [bk 30 rt 90 fd 50]
```

Move the cursor to the end of the new procedure:

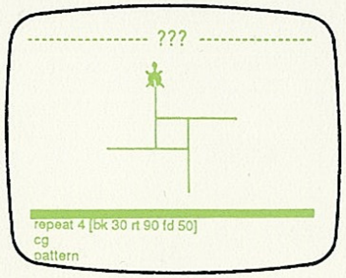
```
to pattern
repeat 4 [bk 30 rt 90 fd 50] □
```

Press Return Enter and type **end**:

```
to pattern
repeat 4 [bk 30 rt 90 fd 50]
end□
```

Flip to the front side of the page and try out your new procedure!

```
pattern
```



```
repeat 4 [bk 30 rt 90 fd 50]
cg
pattern
```

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The "credits" at the end of a movie tell you the names of the movie's creators.

You can add credits to your LogoWriter presentations – and they can even scroll down the screen like they do in films!

To make a line scroll downwards:

- Clear the text from the page:

```
ct
```

- Print a couple of lines:

```
print [Director]
tab
print [Sally Hitchcock]
```

- Move the cursor to the top of the page:

```
top
```

- Print blank lines. The new blank lines will "push" the text downwards:

```
repeat 5 [print [ ]]
```

This procedure prints and scrolls the names of a team of students who worked on a project. The title stays on the screen while their names scroll:

```
to showteam
ct
ht
print [The LogoWriter Team]
print [ ]
print [Jamie McDonnell]
cu
repeat 16 [print [ ]]
top
cd
print [Barbara Snider]
cu
repeat 16 [print [ ]]
ct
end
```

Try it:

```
showteam
```

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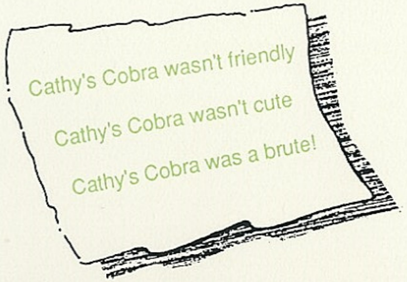

Cathy's Cobra wasn't friendly
Cathy's Cobra wasn't cute
Cathy's Cobra was a brute!

Program a key to type for you.

Type:

```
when "z [insert [Cathy's Cobra]]
```

Now press Control-Z Ctrl-Z a few times.

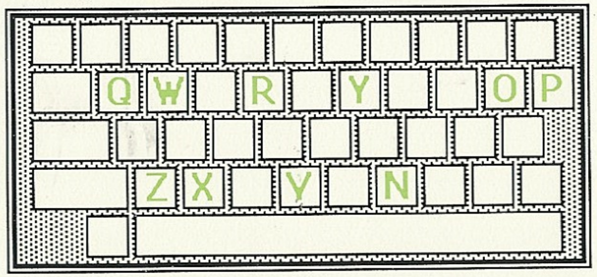
Use your new "magic key" to help you type your text. Every time you want to type "Cathy's Cobra" just press Control-Z Ctrl-Z.

Program some more keys to type other words or sentences:

```
when "w [insert [Wally's Wombat]]
when "r [insert [The Knights of the
Round Table]]
when "p [pr [ ]]
```

This prints a blank line.

These are the ten keys that can be used with **when**: NOPQR, VWXYZ.



To clear the programs from the **control** keys, type:

```
clearevents
```

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One Key Graphic Tricks

Program keys to help you create designs and pictures.

Type:

```
when "z [pd fill]
when "x [pd shade]
```

Make some areas to fill and shade. Draw a picture that you like, or type:

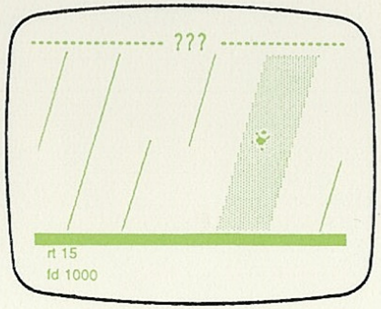
```
rg
rt 15
fd 1000
```

Press the **turtle-move** keys.

Use the **arrow keys** to place the turtle in an area that you want to fill.

Press **Escape.**

Now press Control-Z Ctrl-Z to fill.



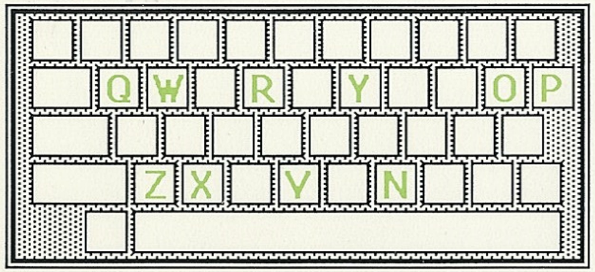
Move the turtle into another area.

Press Control-X Ctrl-X to shade.

Program other "magic keys":

```
when "r [repeat 3 [fd 50 rt 120]]
when "v [pu]
when "y [pd]
```

These are the ten keys that can be used with **when**:
NOPQR, VWXYZ.



To clear the programs from the **control** keys, type:

```
clearevents
```

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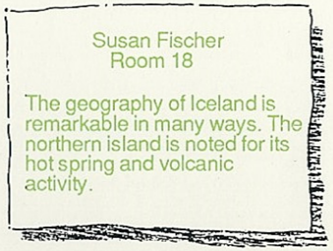
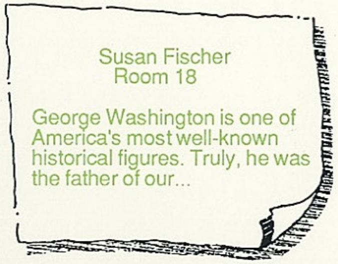


Susan Fischer
Room 18

The geography of Iceland is remarkable in many ways. The northern island is noted for its hot spring and volcanic activity.



Susan Fischer
Room 18

George Washington is one of America's most well-known historical figures. Truly, he was the father of our...

Here's a way to save a little time and energy. Program a key to print your name and class number at the top of your assignments.

Define a procedure that prints the information:

```
to I.D.
top
pr [ ]          This prints a blank line.
tab tab tab
pr [Susan Fischer]
tab tab tab
pr [Room 18]
pr [ ]
pr [ ]
end
```

Program a **control** key to run the procedure:

```
when "z [I.D.]
```

Try it out:

Press Control-Z Ctrl-Z

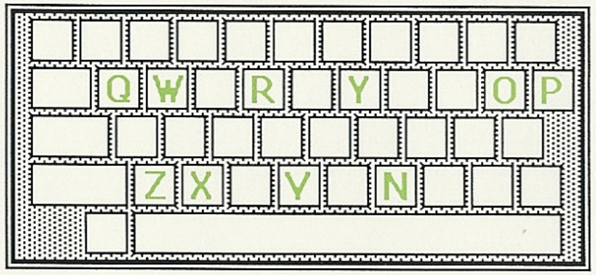
Put the **when** instruction in a procedure, if you want to use it later.

```
to setkey
when "z [I.D.]
end
```

Go to the page that has **I.D.** and **setkey** on it, and type **setkey** to turn on the **control** key.

```
setkey
```

These are the ten keys that can be used with **when**: NOPQR, VWXYZ.



To clear the programs from the **control** keys, type:

```
clearevents
```

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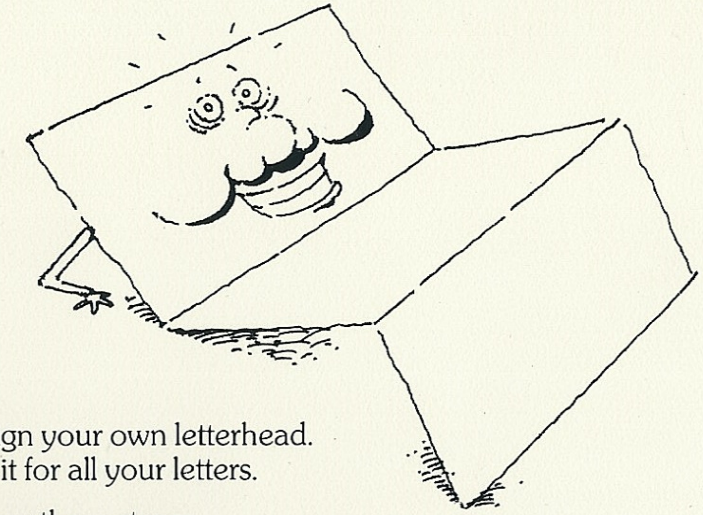
Letterhead



Design your own letterhead.
Use it for all your letters.

Follow these steps:

1. Stamp some shapes:

```
setsh ␣
```

Choose any shape.

Press the **turtle-move** keys.

Use the **arrow** keys to move the turtle.

Press **Escape** and stamp the shape:

```
stamp
```

2. Type your name at the top of the page:

Press the **label** keys.

Use the **arrow** keys to move the label cursor to the top of the page.

Type your name.

Press **Escape**.

3. Name the page:

```
namepage "letter
```

Choose any name you like.

If you want to write a letter using LogoWriter, use regular text:

Press the **up** keys to go up to the page.

Write the letter.

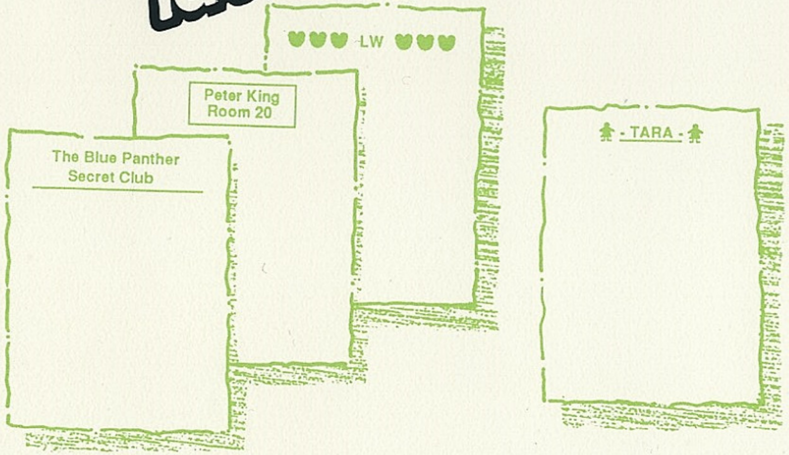
Press the **down** keys to go back to the command center.

When you clear the text with **ct**, the letterhead won't be erased!

Print your letter on a printer:

```
printscreen
```

Try these ideas



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Be My Valentine!

Draw a big heart shape:

```
rg
pu
fd 25
pd
repeat 22 [fd 7 rt 10]
fd 115
pu
home
fd 25
pd
repeat 22 [fd 7 lt 10]
fd 115
```

Press the **up** keys and type in your Valentine message.

Remember to use the **Space bar** and the Return Enter keys to position the cursor.

Press the **down** keys to go back to the command center.

Decorate your card with hearts!

Set the turtle to the heart shape:

```
setsh 14
```

Press the **turtle-move** keys.

Use the **arrow** keys to place the turtle.

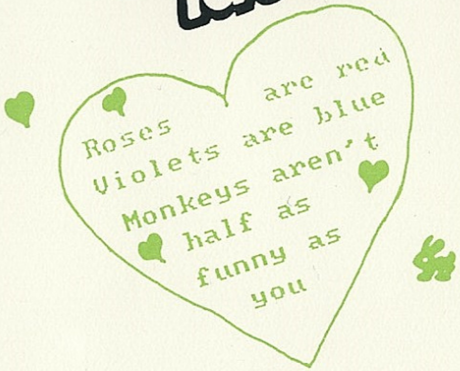
Press **Escape**.

Type:

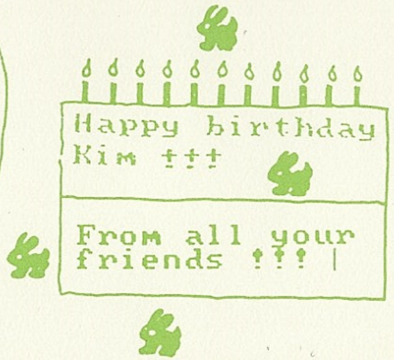
```
stamp
```

Move the turtle and stamp it all over your valentine.

Try these ideas



Roses are red
Violets are blue
Monkeys aren't
half as
funny as
you



Happy birthday
Kim !!!

From all your
friends !!! |

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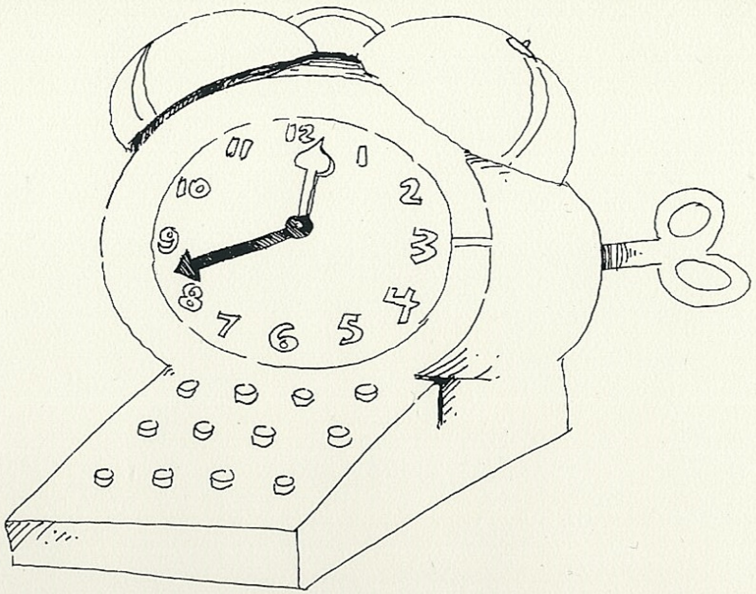
Clock



Draw a square face for the clock:

```
rg
pu
bk 60
lt 90
fd 60
rt 90
pd
repeat 4 [fd 120 rt 90]
pu
home
```

Use **px** to draw the clock hand. **Px** is a special pen – it draws and erases.

```
px
ht
fd 50
bk 50
```

Get the clock hand to move:

```
repeat 60 [fd 50 wait 10 bk 50 rt 6]
```

Try different numbers for **wait**, until the clock hand moves at the speed you prefer.

Put numbers on the clock:

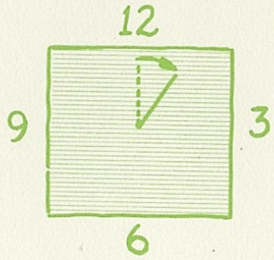
LABEL Press the **label** keys.

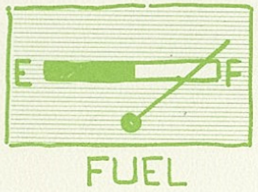
Use the **arrow** keys to move the label cursor.

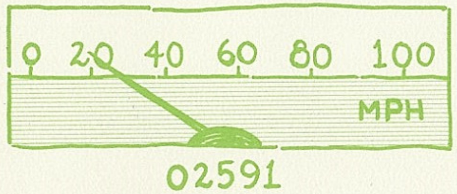
Type the number.

ESC When you have finished, press **Escape**.

Try these ideas







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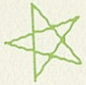
Star Tricks

First, define a procedure which draws a star:



FLIP Go to the flip side.

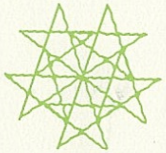
Type this on the page:

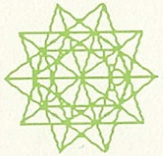
```
to star
repeat 5 [fd 70 rt 144]
end
```

FLIP Flip to the front side and try your **star** procedure.

Draw pinwheels of stars:

```
cg
repeat 5 [star rt 72]
```



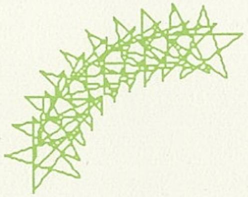


```
cg
repeat 10 [star rt 36]
```

Point the star straight up:

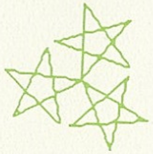
```
cg
rt 18
star
```

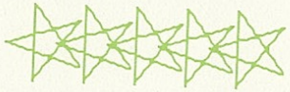
Draw an arc of stars:



```
cg
pu
bk 70
repeat 10 [pd star pu fd 10 rt 10]
```

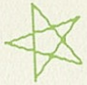
Try these ideas





ISBN 2-89371-004-2.
Printed in Canada.

First, define a procedure which draws a star:



FLIP Go to the flip side.

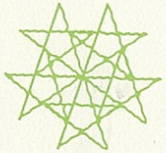
Type this on the page:

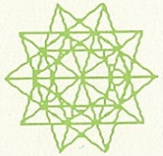
```
to star
repeat 5 [fd 70 rt 144]
end
```

FLIP Flip to the front side and try your **star** procedure.

Draw pinwheels of stars:

```
cg
repeat 5 [star rt 72]
```



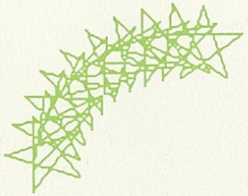


```
cg
repeat 10 [star rt 36]
```

Point the star straight up:

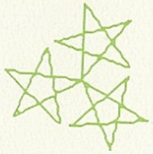
```
cg
rt 18
star
```

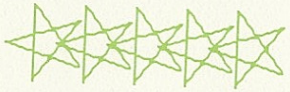
Draw an arc of stars:



```
cg
pu
bk 70
repeat 10 [pd star pu fd 10 rt 10]
```

Try these ideas





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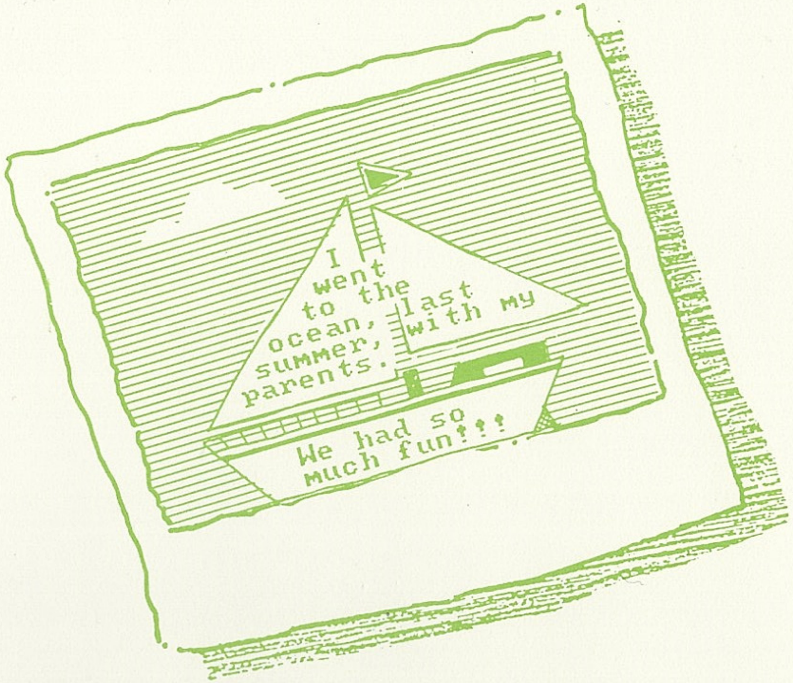
Shape Your Stories



I
went
to the
ocean, last
summer, with my
parents.

We had so
much fun!!!

Start by drawing a shape:

Press the **turtle-move** keys.

Place the turtle with the **arrow** keys.

Press **Escape**.

Use the turtle drawing commands (**fd**, **bk**, **lt**, **rt**, and **pu**, **pd**, **pe**) to draw.

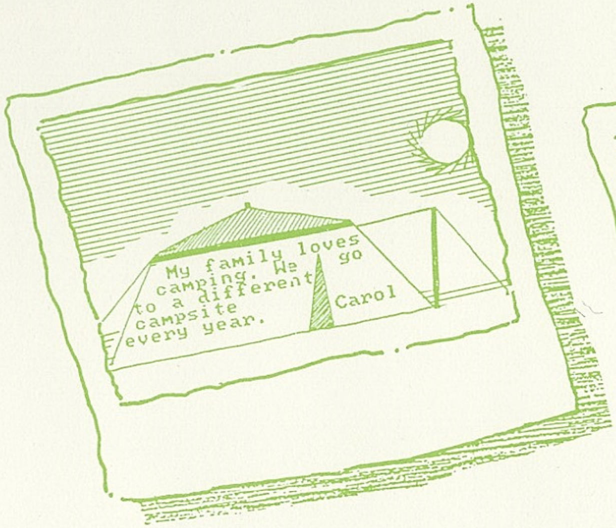
Type a story or poem inside the shape:

Press the **up** keys to go up to the page.

Type in your words.

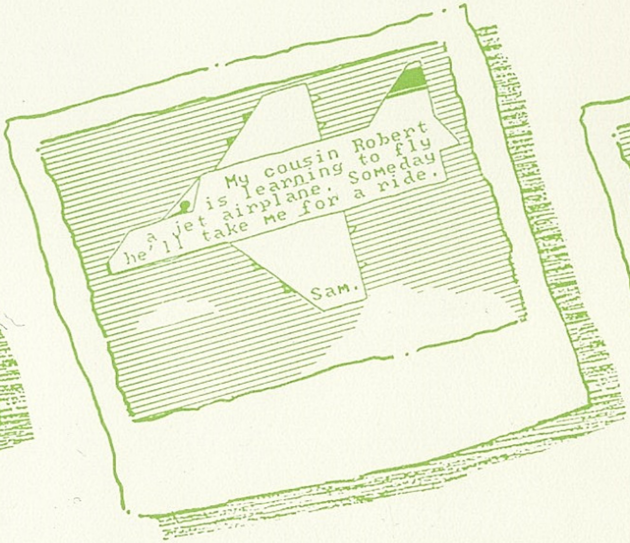
Use the **Space bar** and the Return Enter keys to position the cursor.

Press the **down** keys to go back to the command center.



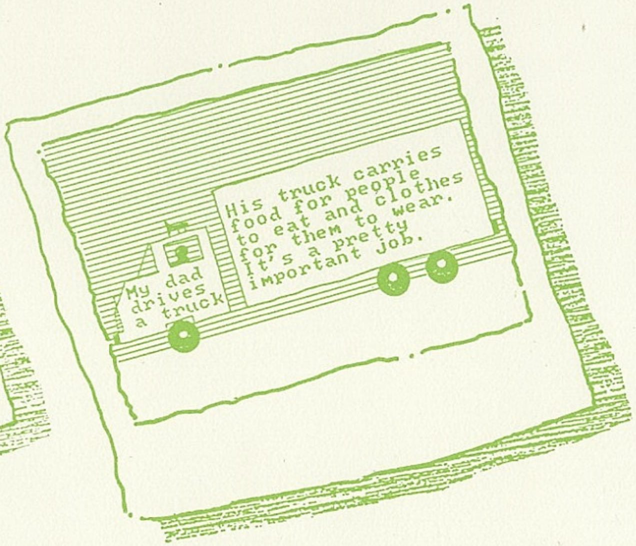
My family loves camping. We go to a different campsite every year.

Carol



My cousin Robert is learning to fly a jet airplane. Someday he'll take me for a ride.

Sam.



My dad drives a truck

His truck carries food for people to eat and clothes for them to wear. It's a pretty important job.

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Melody

You can play music on the LogoWriter keyboard!

First, define a procedure for each of the notes in an octave:

```
to c
tone 523 20
end

to d
tone 587 20
end

to e
tone 659 20
end

to f
tone 698 20
end

to g
tone 784 40
end
```

The time for G is twice as long – you'll hear why when you play the song.

```
to a
tone 880 20
end

to b
tone 988 20
end
```

Try them out:

```
c
d
e
```

To play a melody, put several notes on a line:

```
e d c d e e e
```

Press Return Enter

Define a procedure for a song:

```
to guess
c d e c
c d e c
e f g
e f g
end
```

Name that tune!

Can you define procedures to play other songs?

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Helicopter

Set the turtle to a helicopter shape:

```
rg
setsh 25
```

Or use your own shape number.

Move it up:

```
pu
repeat 20 [fd 2]
```

Move it sideways:

```
rt 90
repeat 160 [fd 2]
```

Make the motor roar as it moves:

```
repeat 150 [fd 2 tone 40 1]
```

Define a procedure that moves the helicopter. Use an input for the distance:

```
to move :distance
repeat :distance [fd 1 tone 40 1]
end
```

Try:

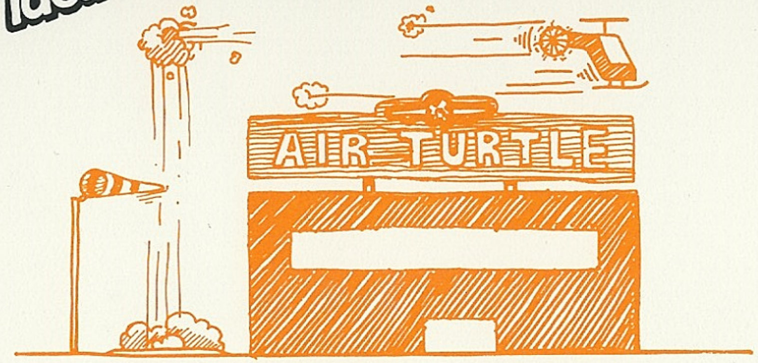
```
home
move 40
rt 90
move 160
rt 90
move 40
```

Now you can define a **trip** procedure:

```
to trip
rg
setsh 25
pu
move 40
rt 90
move 160
rt 90
move 40
end
```

Try it!

Try these ideas



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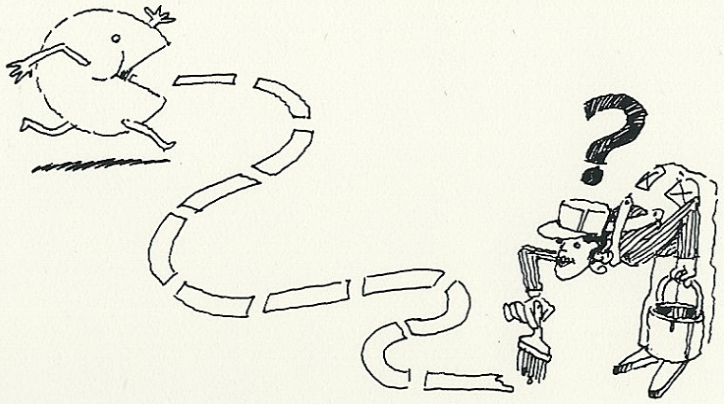
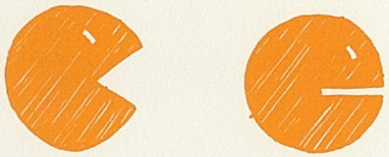
Line Gobbler



Make a little "monster" that gobbles up a line!

Make two "gobbler" shapes:



Go to the Shapes page:

```
shapes
```

FLIP Go to the flip side of the page.

Find two empty shapes, or shapes you want to replace.

Make the gobbler shapes.

ESC Press **Escape** to return to your page.

Draw a line for the gobbler to gobble:

```
rg
rt 90
repeat 25 [pd fd 4 pu fd 4]
```

Move the gobbler to the center of the page and get it ready to go:

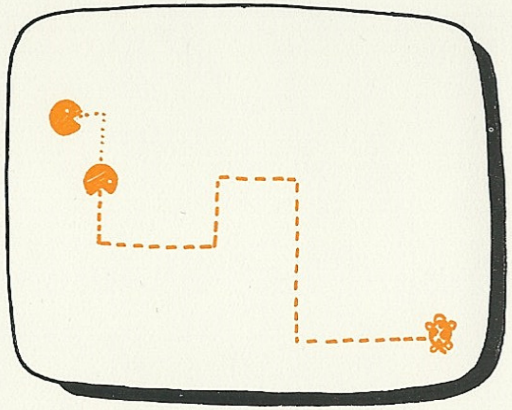
```
home
rt 90
pe
```

Now free the monster!

```
repeat 50 [setsh ⌴ fd 2 wait 5 setsh ⌴ fd 2]
```

Use the shape numbers of your gobbler shapes.

Try these ideas



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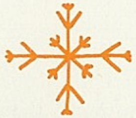
It's Snowing!

Go to the Shapes page and make a snowflake shape:



Put the four turtles at different positions:

Tell a turtle to show:

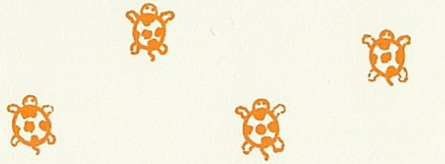
```
tell 0
st
```

Press the **turtle-move** keys.

Place the turtle with the **arrow** keys.

Press **Escape**.

Follow the same steps to place turtles 1, 2, and 3.



Set the turtles to the snowflake shape:

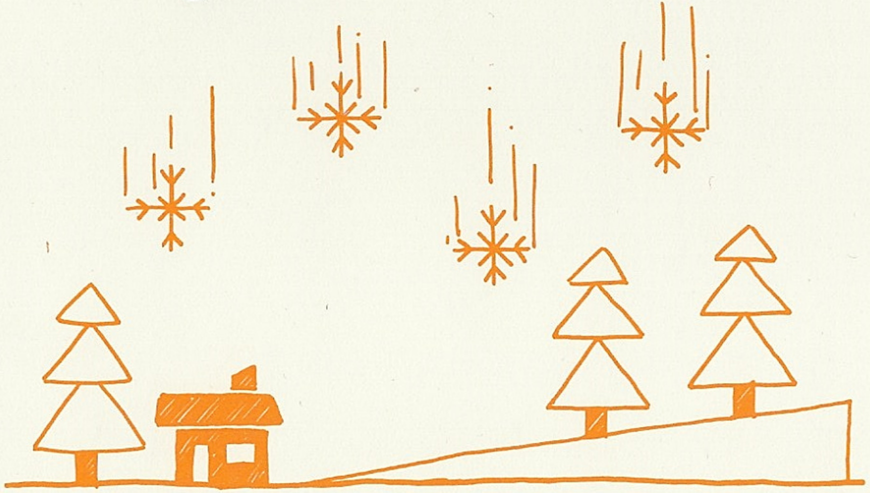
```
tell [0 1 2 3]
setsh ␣
```

Your snowflake shape.

Turn them down. Then move them all a little at a time, so they "fall" like snowflakes:

```
rt 180
pu
repeat 500 [fd 1]
```

Try these ideas



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Snowman

You've already drawn polygons: squares, rectangles and triangles are polygons.

Draw these polygons:

3 x 120 = 360

```
rg
repeat 3 [fd 25 rt 120]
```

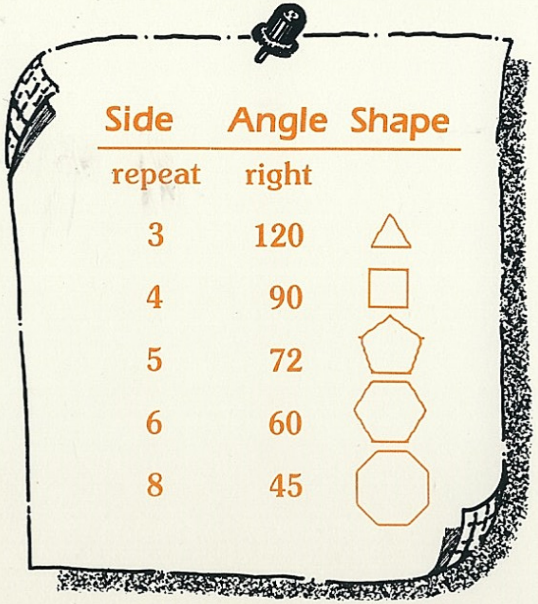
5 x 72 = 360

```
cg
repeat 5 [fd 25 rt 72]
```

8 x 45 = 360

```
cg
repeat 8 [fd 25 rt 45]
```

Here's a table to help you draw polygons:



Side	Angle	Shape
repeat	right	
3	120	△
4	90	□
5	72	⬠
6	60	⬡
8	45	⯃

Try this:

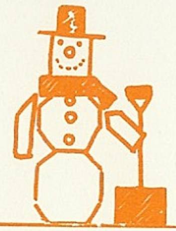
Draw a snowman using polygons!

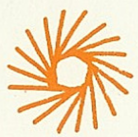
Hints:

Use the **turtle-move** keys and the **arrow** keys to place the turtle for each polygon.

Use **label** to draw the eyes, nose and buttons.

Try these ideas





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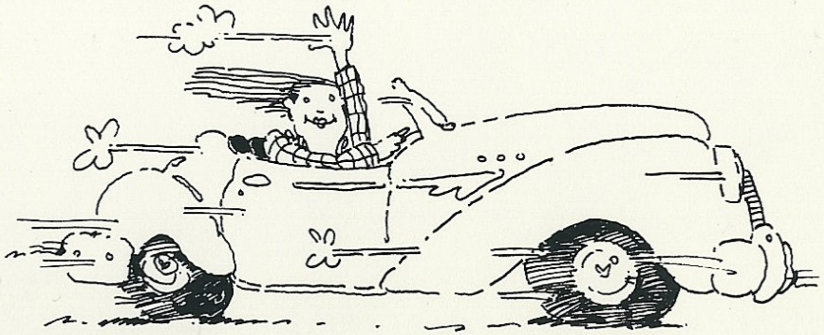
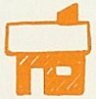
On the Road



Set two turtles to a house shape:

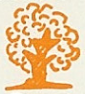
```
rg
tell [0 3]
st
setsh 20
setc ⎵
stamp
```



Or use your own house shape.

Set the other two turtles to a tree shape:

```
tell [1 2]
st
setsh 23
setc ⎵
```



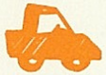
Or use your own tree shape.

Stamp the trees beside the houses:

```
pu
rt 90
fd 20
lt 90
fd 40
pd stamp
```

Change two of the turtles to a car shape:

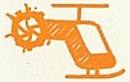
```
tell [0 3]
pu
bk 40
setsh 27
setc ⎵
```



Or use your own car shape.

Change turtles 1 and 2 to a helicopter shape:

```
tell [1 2]
pu
fd 60
setsh 25
setc ⎵
```



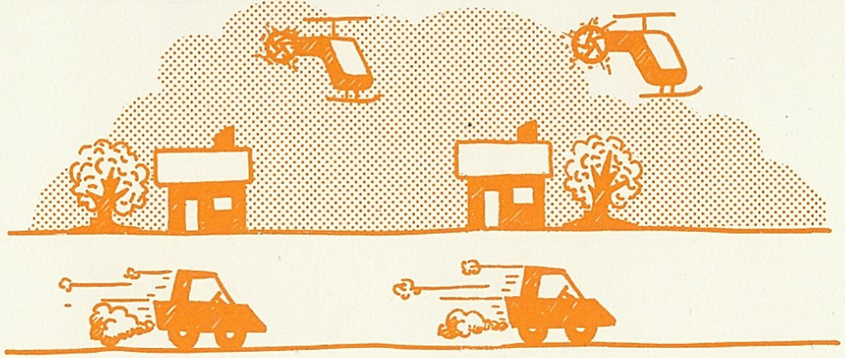
Or use your own helicopter shape.

Now for the fun! Set all the turtles in motion:

```
tell all
rt 90
repeat 200 [fd 2]
```

Make *all* four turtles listen.

Try these ideas



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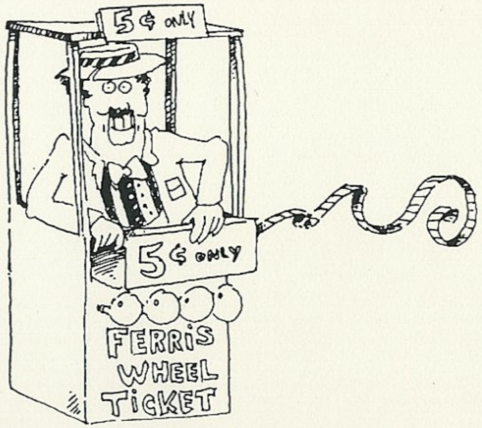
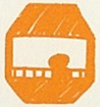
Ferris Wheel


5¢ ONLY
5¢ ONLY
FERRIS
WHEEL
TICKET

Make a shape for the ferris wheel cars:



Place the four turtles in the center of the page:

```
rg
tell all
pu
setpos [0 0]
```

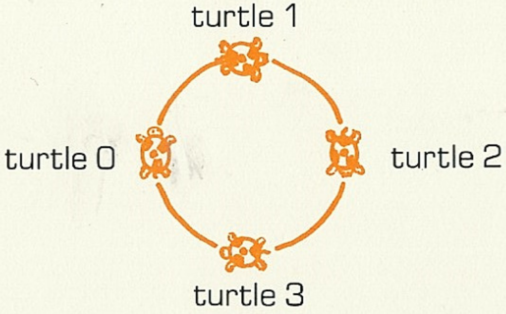
Put them in the center.

Draw a circle using turtle 0:

```
tell 0
pd
repeat 360 [fd 1 rt 1]
```

Position the turtles:

```
tell 1 st
repeat 90 [fd 1 rt 1]
tell 2 st
repeat 180 [fd 1 rt 1]
tell 3 st
repeat 270 [fd 1 rt 1]
```


turtle 1
turtle 0
turtle 2
turtle 3

Set all the turtles to the ferris wheel car shape:

```
tell all
setsh ⌴
```

Your shape number.

Make the ferris wheel cars turn:

```
repeat 1000 [fd 1 rt 1]
```

Try these ideas

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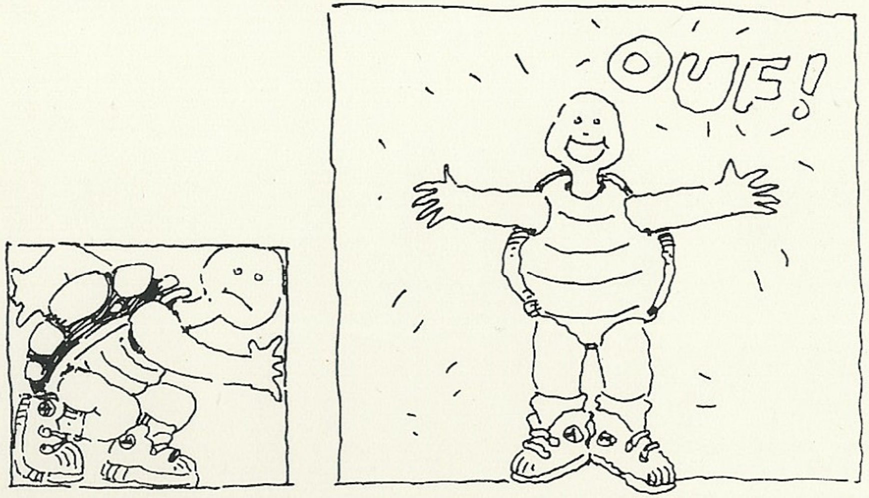
One Square for All Sizes!

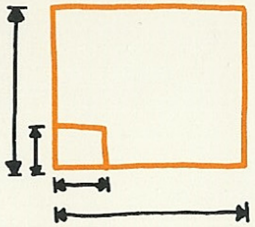


Here's a **square** procedure that draws small squares:

```
to square
repeat 4 [fd 15 rt 90]
end
```

This one draws big squares:

```
to square
repeat 4 [fd 80 rt 90]
end
```



The input to **fd** is the only thing that changes.

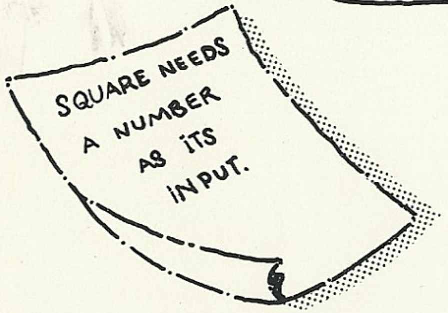
You can define one procedure for a square of all sizes! Use a name for the input instead of the number:

```
to square :length
repeat 4 [fd :length rt 90]
end
```

Length is the name.

Put a colon in front.

Try it:

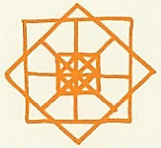

SQUARE NEEDS A NUMBER AS ITS INPUT.

```
square 15
```

:length is 15 steps.

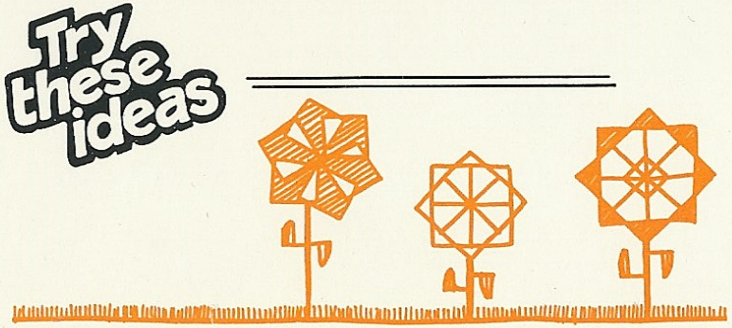
```
square 75
```

:length is 75 steps.



```
cg
repeat 5 [square 20 rt 45]
repeat 5 [square 40 rt 45]
ht
```

Try these ideas



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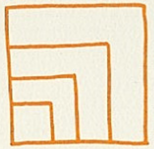
Gift Box

Define a **square** procedure with an input:

```
to square :length
repeat 4 [fd :length rt 90]
end
```

Try:

```
square 10
square 20
square 30
square 40
```



Define a **foursquares** procedure:

```
to foursquares
square 10
square 20
square 30
square 40
end
```

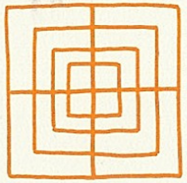
Try:

```
repeat 4 [foursquares rt 90]
```

Define a **giftbox** procedure:

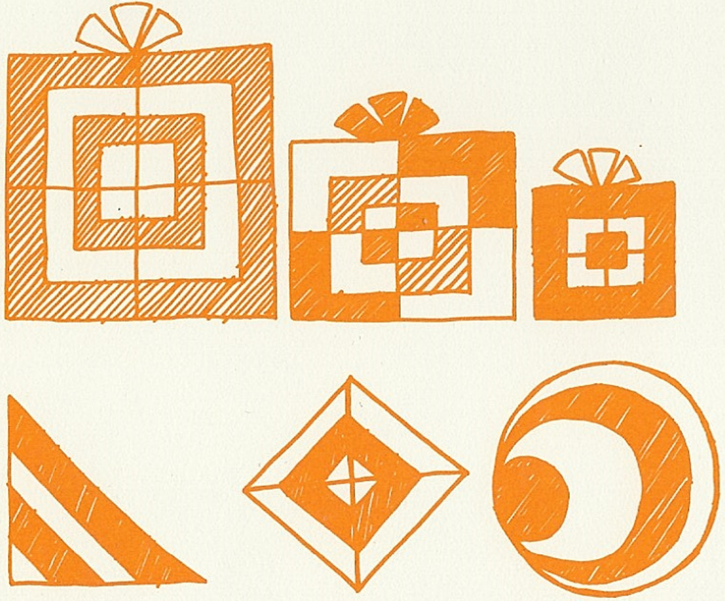
```
to giftbox
repeat 4 [foursquares rt 90]
end
```

```
giftbox
```



Can you put a bow on it?

Try these ideas



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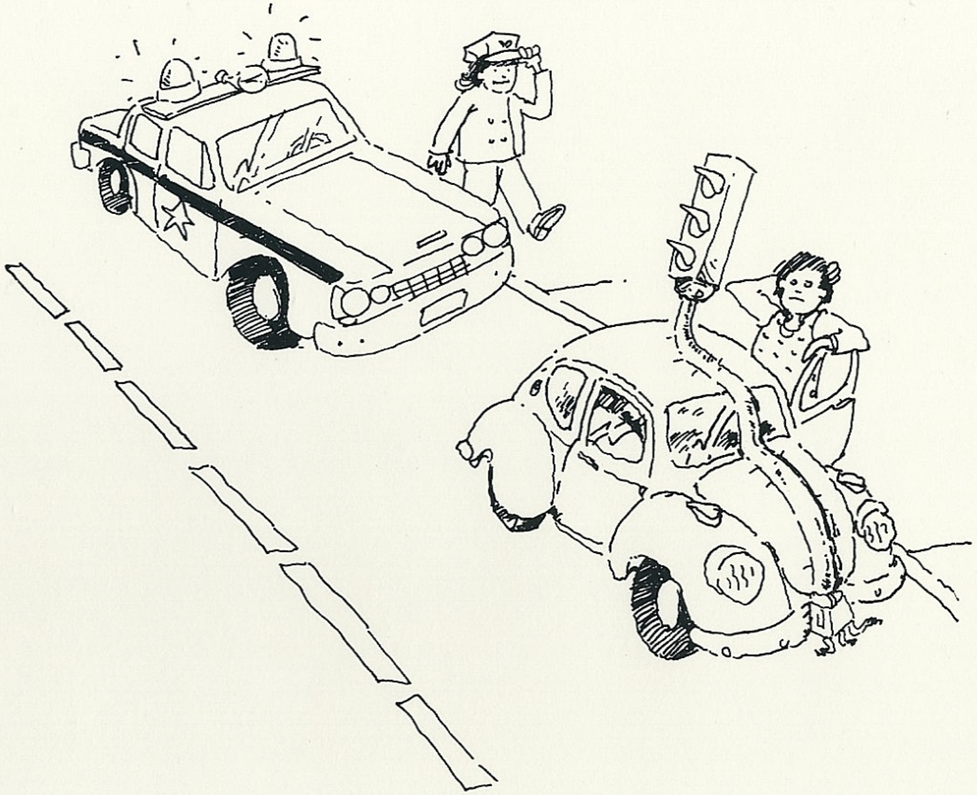
Traffic Signs



Have you drawn polygons? Squares are polygons:

```
rg
repeat 4 [fd 50 rt 90]
```

Here are some more:

```
repeat 6 [fd 50 rt 60]
repeat 3 [fd 50 rt 120]
repeat 8 [fd 50 rt 45]
```

Here's a procedure to draw different polygons. The input **number** stands for the number of sides.

```
to polygon :number
repeat :number [fd 50 rt 360/:number]
end
```

Don't forget the colon!

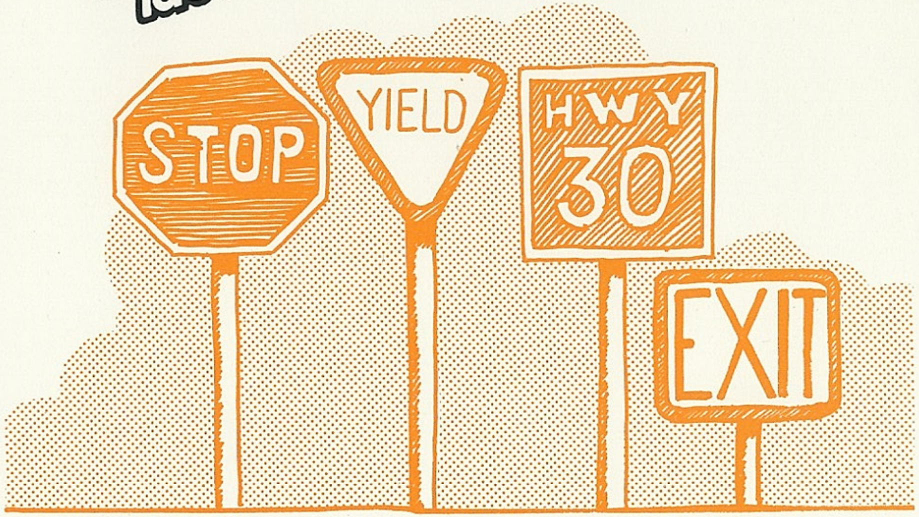
Try:

```
cg
polygon 3
polygon 4
polygon 8
```

Now use the **polygon** procedure to draw traffic signs!

LABEL Use **label** to type the letters.

Try these ideas



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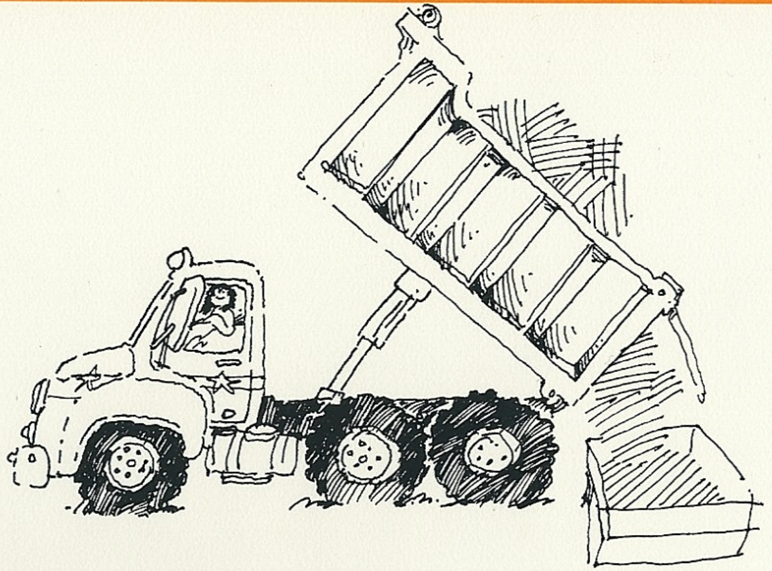
A Fill-in Procedure



Define a procedure to fill in shapes:

```
to filler
pu
rt 45 fd 10
pd                  Put the pen down to fill.
fill
bk 10 lt 45         Return to the starting position.
end
```

Try it out!

```
rg
repeat 6 [fd 30 rt 60]
filler
```

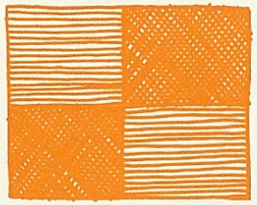
Use **filler** in other procedures:

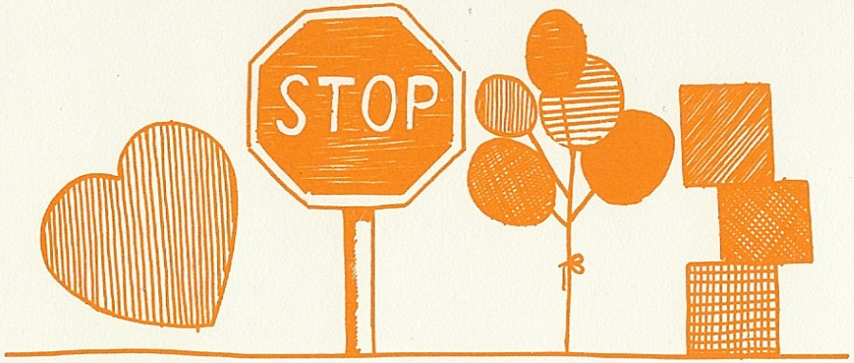
```
to fillsquare :color
setc :color
repeat 4 [fd 50 rt 90]
filler
end
```

Try **fillsquare**:

```
cg
fillsquare 3
rt 90
fillsquare 2
rt 90
fillsquare 3
rt 90
fillsquare 2
ht
```

Try these ideas





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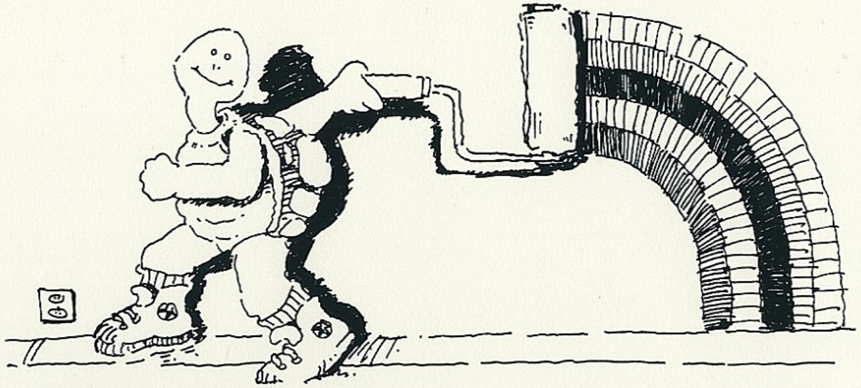
Draw Thick Lines

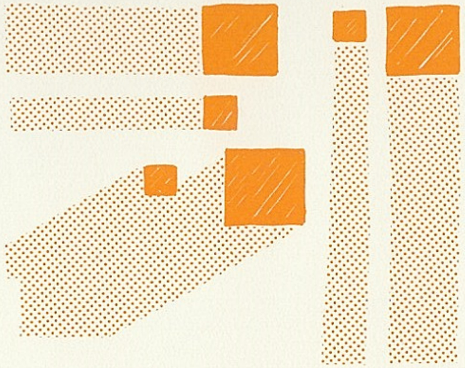


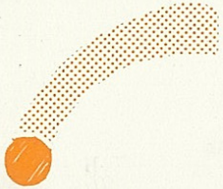
If the turtle stamps its shape, then goes forward a little and stamps its shape again many times, it will draw a very thick line.

Try:

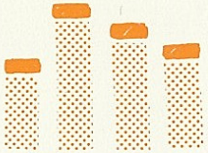
```
rg
setsh 11
repeat 50 [stamp fd 1]
```

Stamp with different shapes. The thickness of the line depends on the size of the shape.





Round shapes turn corners smoothly.



Short wide shapes are the best for making bar charts.

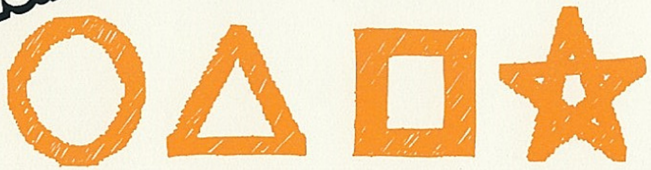
Define a procedure to draw thick lines:

```
to brush :distance
repeat :distance [stamp fd 1]
end
```

Use **brush** like you use **fd**:

```
cg
brush 40
cg
repeat 3 [brush 50 rt 120]
```

Try these ideas



ISBN 2-89371-004-2.
Printed in Canada.

Look at All Your Pages!

Do you want to know the names of all your pages?
Do you want to look at each one?

In the command center, type:

```
show pagelist
```

Pagelist reports the names of all the pages in your scrapbook.

Show the pages one after the other:

```
getpage "␣        A name in your list.
getpage "␣        Another name.
getpage "␣        Another name.
```

and so on.

If you put all these instructions in a procedure, you can make a "slide show".

```
to slideshow
getpage "page2
getpage "page3        Use your page names.
getpage "page1
end
```

The page you're on should be the last one in the procedure.

Now, sit back and watch the show!

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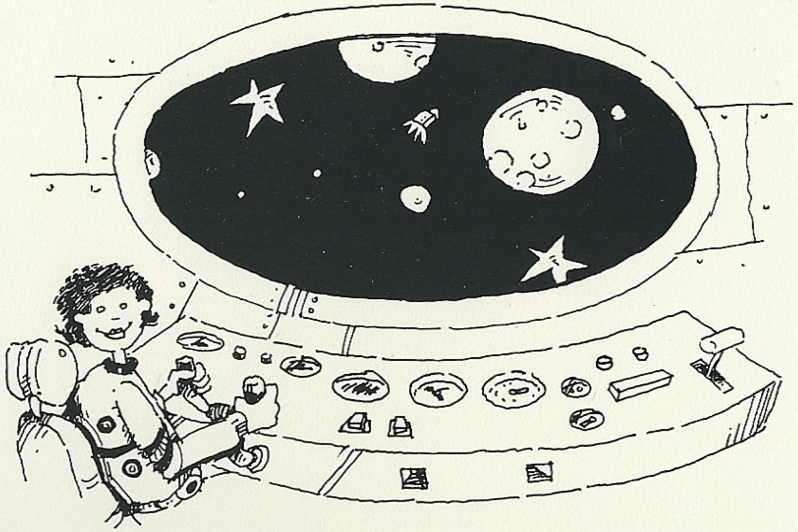
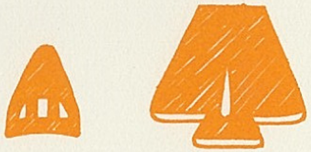
Rocket Take Off



Make two shapes for a rocket:



Go to the Shapes page:

```
shapes
```

Go to the flip side of the page.

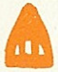
Find two empty shapes, or shapes you want to replace.

Make the rocket shapes.

Press **Escape** to return to your page.

Give turtle 0 the top shape:

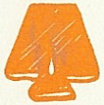
```
rg
setsh ␣
```



Your shape number.

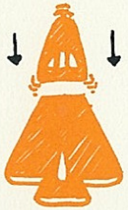
Give turtle 1 the bottom shape:

```
tell 1
st
setsh ␣
```



Your other shape number.

"Assemble" your rocket:



```
tell 0
pu
bk 20
```

Now for the take off!

```
tell [0 1]
pu
repeat 200 [fd 1]
tell 0
repeat 50 [fd 1]
```

Make both turtles listen.

Try these ideas

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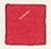
A Turtle Eraser

Here's a handy trick for erasing graphics:

If you stamp with the **pe** pen, the turtle becomes an eraser.

Make a couple of "eraser" shapes on the Shapes page.

To erase a big area.



For little mistakes.

Define an **eraser** procedure:

```
to eraser
pe
stamp
pu
end
```

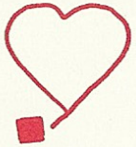
Program a **control** key to erase under the turtle:

```
when "x [eraser]
```

Set the turtle to one of the eraser shapes.

`setsh ␣` An eraser shape number.

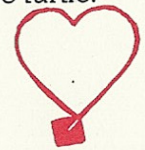
Move the turtle over a mistake:



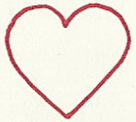
Press the **turtle-move** keys.

Use the **arrow** keys to move the turtle.

Press **Escape** .



Press Control-X Ctrl-X Presto! Everything underneath is erased.



Fill the page with color, and "cut out" shapes with the eraser.

Try these ideas

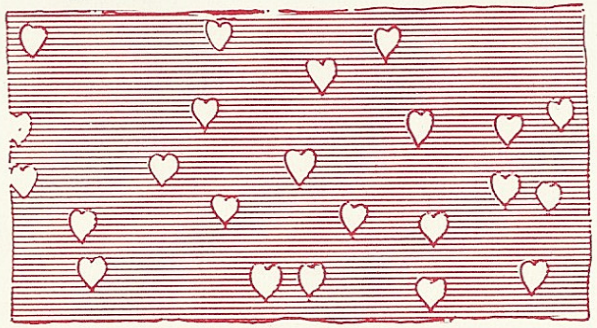


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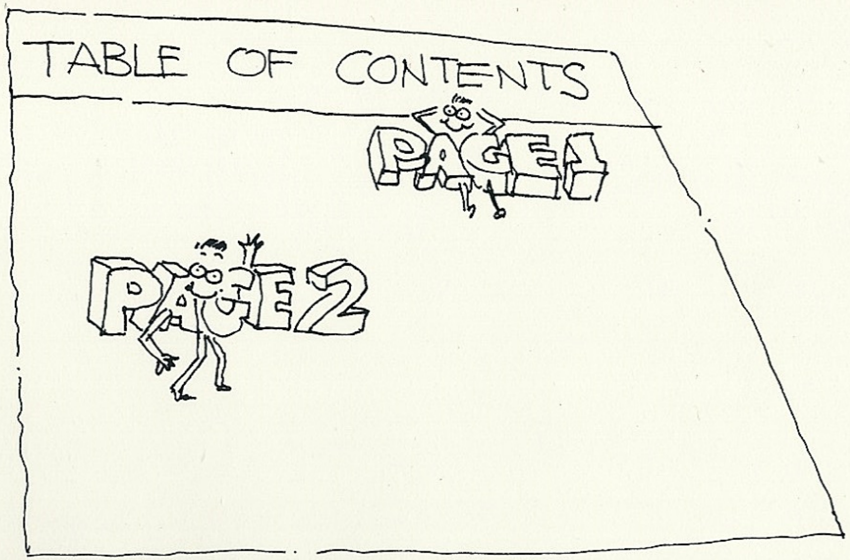
Table of Contents



Make a Table of Contents of all the pages in your scrapbook and print it out.

Pagelist reports the names of all the pages in your scrapbook:

```
print pagelist
```

Print one page name at a time:

```
print item 1 pagelist
```

Item 1 reports the first item in the list.

Now print the table of contents:

```
ct
ht
print item 1 pagelist
print item 2 pagelist
print item 3 pagelist
. . .
```

When there aren't any more page names to print, LogoWriter will give you the message:

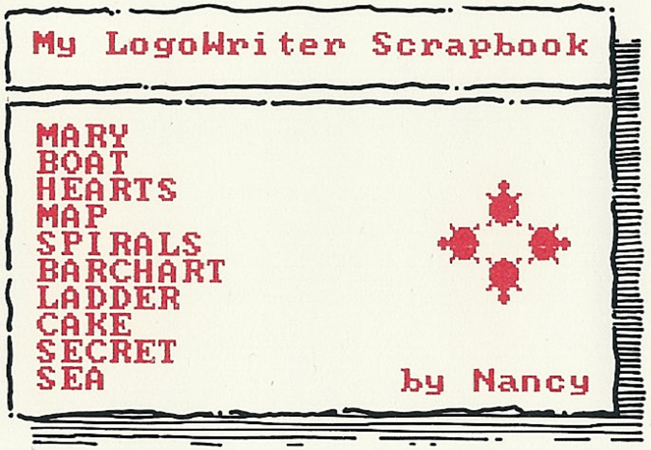
```
Too few items in ⌴
```

The names of your pages.

Now "dress up" the table of contents. Put a title at the top:

```
top
pr [ ]
top
tab tab
print [My LogoWriter Scrapbook]
repeat 2 [pr [ ]]
```

Add some final touches if you like:



```
My LogoWriter Scrapbook

MARY
BOAT
HEARTS
MAP
SPIRALS
BARCHART
LADDER
CAKE
SECRET
SEA                    by Nancy
```

Print it on a printer:

```
printscreen
```

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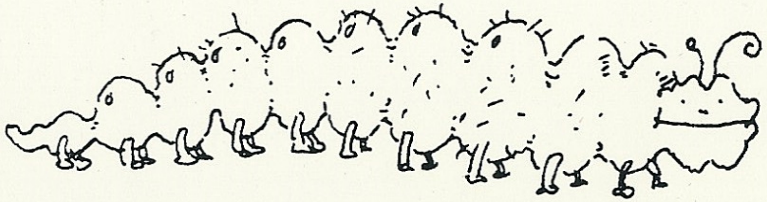
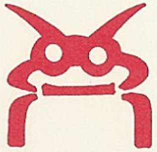
Caterpillar



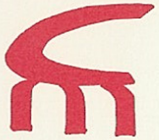
Use the four turtles to make a crawling caterpillar.

Make these shapes:

For the caterpillar's head.

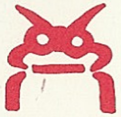


For the body segments.

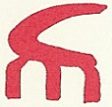


Give the four turtles their shapes:

```
to setshapes
tell 0
setsh ⌴
tell [1 2 3]
st
setsh ⌴
end
```



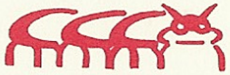
The head.



The body segment.

Line them up:

```
to lineup
tell all
cg pu
setpos [0 0]
rt 90
tell 1
bk 12
tell 2
bk 24
tell 3
bk 36
end
```



Crawl gets the caterpillar crawling:

```
to crawl
tell all
each [fd 10 wait 10]
wait 30
crawl
end
```

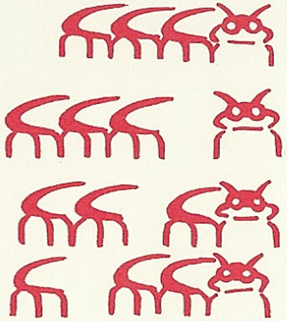
Each turtle moves, one at a time.

Caterpillar is the superprocedure that runs the three subprocedures:

```
to caterpillar
setshapes
lineup
crawl
end
```

Try it out:

```
rg
caterpillar
```



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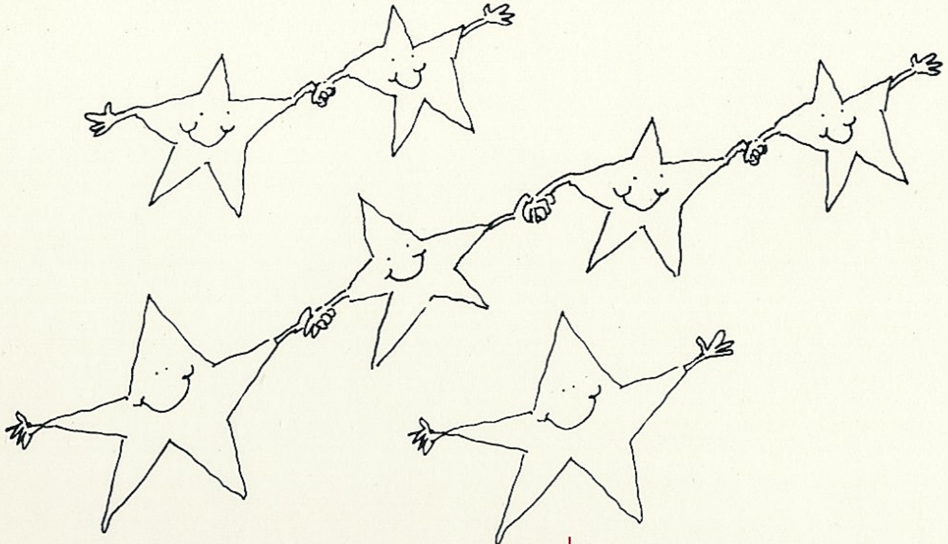
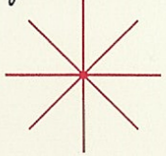
A Starry Sky



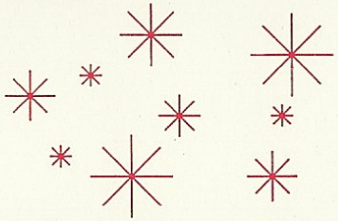


Define a **star** procedure:

```
to star :length
repeat 8 [fd :length bk :length rt 45]
end
```

Length is the length of each arm.

Draw stars of **random** size:



```
rg
star random 30
```

Reports a number from 0 through 29.

Define a superprocedure to put a star at a random place:

```
to put.star
pu
rt random 360
fd random 100
pd
star random 30
end
```

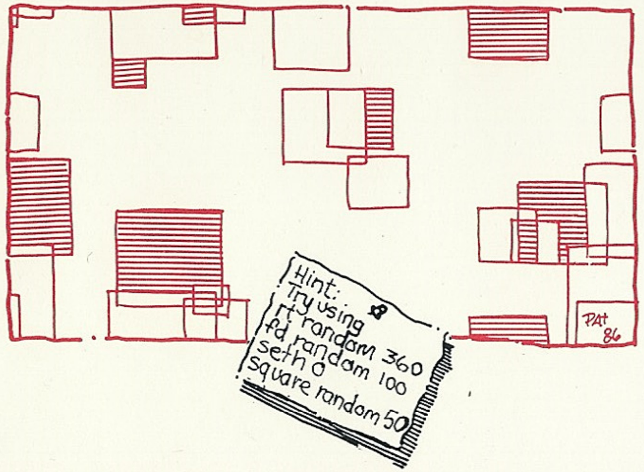
Make a starry sky:

```
cg
repeat 30 [put.star]
```

Do another. The sky will be different each time.

```
cg
repeat 30 [put.star]
```

Try these ideas


Hint:
Try using
rt random 360
fd random 100
seth 0
square random 50
PAT 86

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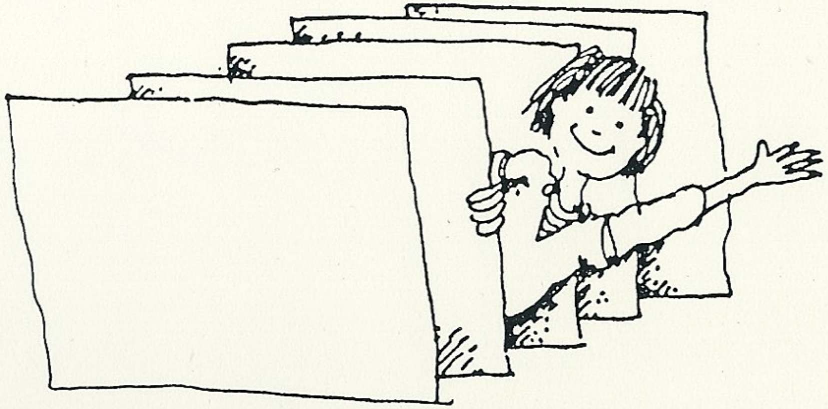
Quick Change



You don't have to go to the Shapes page to see all your shapes.

Try:

```
setsh 0
repeat 30 [setsh shape + 1 wait 20]
```

Shape is a reporter. It reports the shape number of the turtle. **Shape + 1** is the next shape.

Change the background color:

```
repeat 5 [setbg bg + 1 wait 20]
```

Bg reports the number of the background.

How about the turtle's color?

```
repeat 10 [setc color + 1 wait 20]
```

To get the original shape and colors back:

```
rg
```

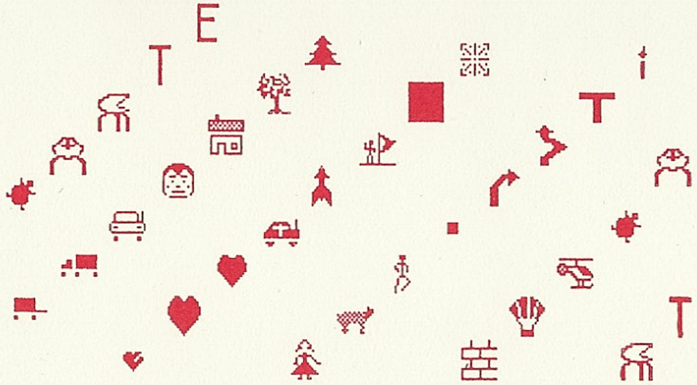
Put them together:

```
to showoff
setsh shape + 1
setc color + 1
pd
stamp
pu
fd 30
end
```

Try:

```
tell all
st
rt 60
repeat 10 [showoff]
```

Try these ideas



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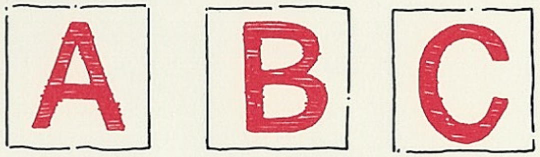
Big Titles

You can create large colorful titles. Use shapes for the letters and stamp them.



Go to the Shapes page and make letter shapes.

Define a **title** procedure with an input for the shape number:

```
to title :shape
setsh :shape
pd
stamp
pu
fd 20
end
```

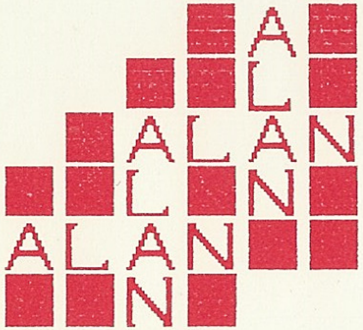
To print a title line:

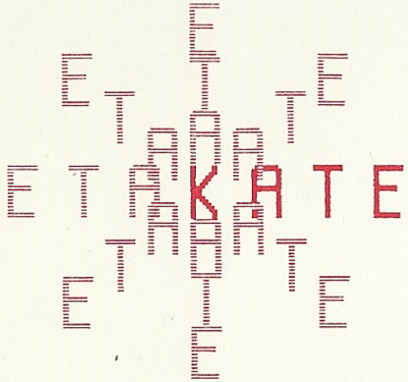
```
cg
ht
setc ␣         Choose a color.
rt 90
title 1        Stamps the letter in shape 1.
title 2        Stamps the letter in shape 2.
title 3        Stamps the letter in shape 3.
```

Print the title downwards:

```
seth 180
title 4
title 5
title 6
```

Try these ideas





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Spirals

A spiral is a shape that never closes. Each side is drawn a bit longer than the previous one.

Draw a square spiral the "long way":

```
rt 90 fd 10
rt 90 fd 15
rt 90 fd 20
rt 90 fd 25
rt 90 fd 30
rt 90 fd 35
```

Now do it the short way by defining a procedure:

```
to squarespi :length
fd :length
rt 90
squarespi :length + 5
end
```

Every time **squarespi** runs, **:length** increases by 5.

Try:

```
cg
squarespi 10
```

STOP Press the **stop** keys to stop it.

Define other spiral procedures – with different inputs to **rt**.

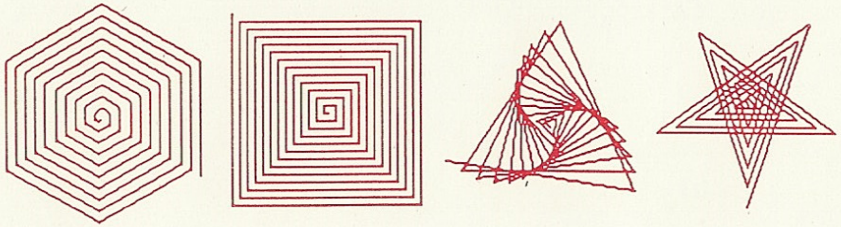
```
to twistspi :length
fd :length
rt 95
squarespi :length + 5
end
```

```
to trispi :length
fd :length
rt 120
trispi :length + 5
end
```

```
to twisttri :length
fd :length
rt 125
twisttri :length + 5
end
```

Try them!

STOP Press the **stop** keys to stop any of these procedures.



ISBN 2-89371-004-2.
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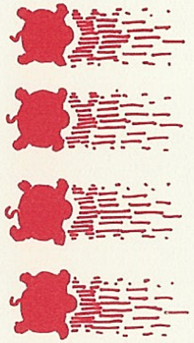
Bring Your Page to Life!

Define a procedure that does something fancy:

```
to lineup
rg
tell all
st
pu
setpos [0 0]
each [fd 20 * who]
rt 90
repeat 50 [bk 1]
ht
end
```



Define a procedure to print a welcome message:

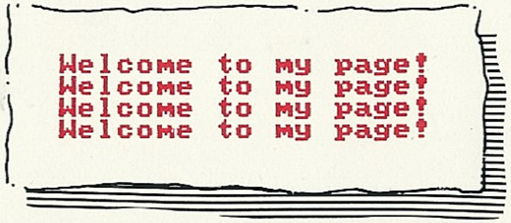
```
to welcome
label [Welcome to my page!]
end
```

Try them out:

```
lineup
welcome
```

Now define a procedure called **startup**. **Startup** is a "special name" that's built into LogoWriter: it makes things happen automatically when you open any LogoWriter page.

```
to startup
lineup
welcome
end
```



```
Welcome to my page!
Welcome to my page!
Welcome to my page!
Welcome to my page!
```

Name the page:

```
namepage "test
```

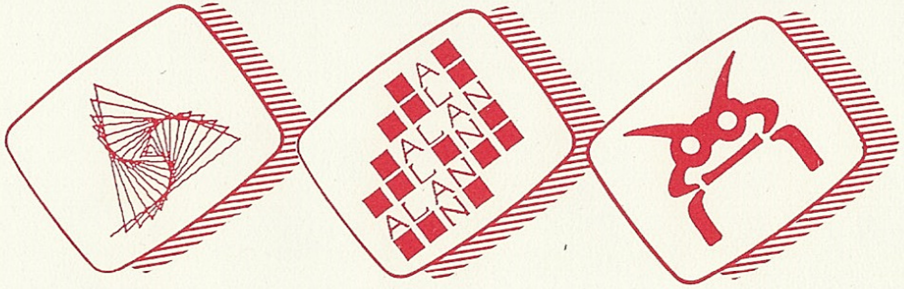
ESC Press **Escape** to go to Contents.

Choose the page named Test.

Watch the show!

You can have a procedure named **startup** on any page. Any time you choose the page from Contents, or open it with **getpage**, the **startup** procedure will run.

Try these ideas



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Sound Effects APPLE® ONLY

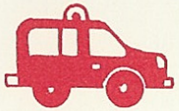
Here's a siren:

```
tone 600 20 tone 1000 20
```

Make it go on and on:

```
repeat 10 [tone 600 20 tone 1000 20]
```

Make an ambulance drive by with its siren wailing!



```
rg
setsh ⌴          An ambulance shape.
rt 90
pu
repeat 10 [fd 5 tone 600 20 tone
           1000 20]
```

Here are some sound effects you can use with video games:

```
to beeps :pitch
repeat 10 [tone :pitch 1]
end
```

High beeps:

```
beeps 1000
```

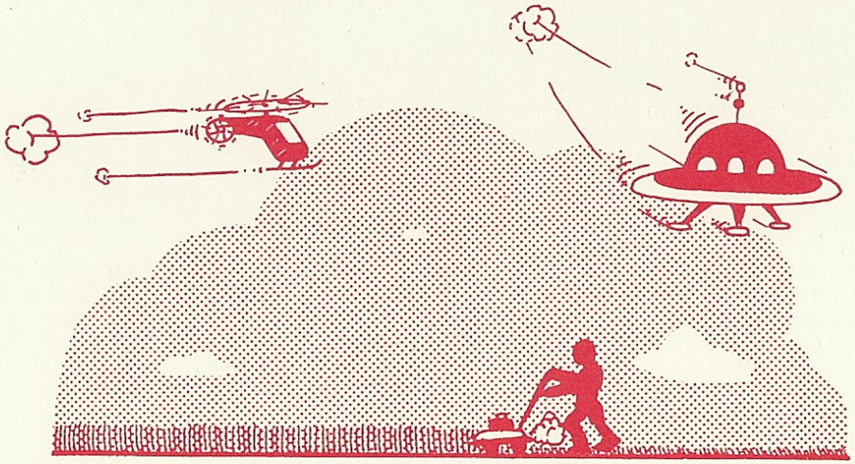
Low beeps:

```
beeps 100
```

An electric motor's hum:

```
tone 60 200
```

Try these ideas



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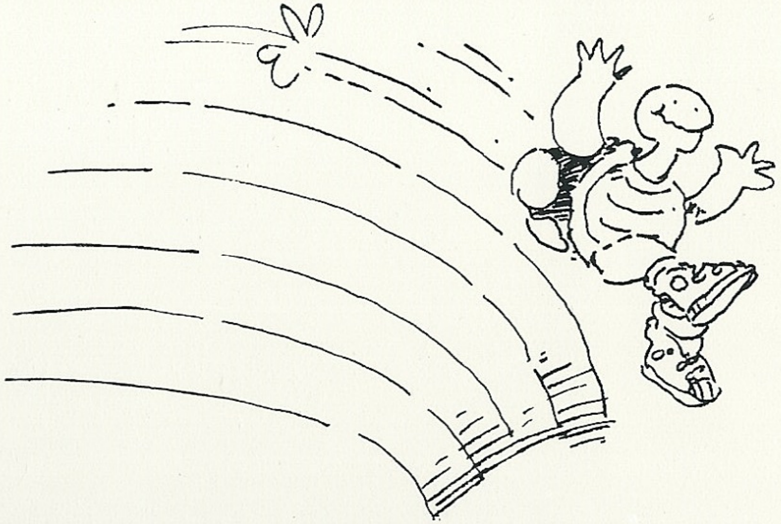
A Rainbow!



Make a four-colored rainbow with the four turtles.

Set each turtle to a different color:

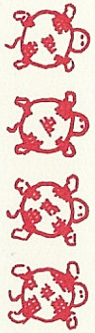
```
rg
tell all
st
each [setc who + 1]
```

Sets each turtle to a color that's one number higher than its own number:

Turtle 0 is set to color 1.
Turtle 1 is set to color 2.
Turtle 2 is set to color 3.
Turtle 3 is set to color 4.

Define a procedure to put the turtles in a row:

```
to turtlerow
tell all
cg
pu
setpos [0 0]
tell 1
fd 20
tell 2
fd 40
tell 3
fd 60
tell all
rt 90
end
```

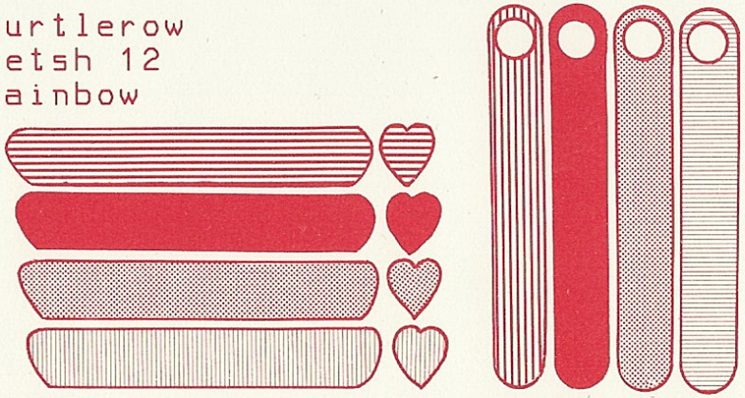


Define a **rainbow** procedure that sets the colors, then draws the stripes:

```
to rainbow
each [setc who + 1]
pd
repeat 30 [stamp fd 3]
end
```

Use a square or circle shape for the clearest rainbow lines. Try it:

```
turtlerow
setsh 12
rainbow
```



ISBN 2-89371-004-2.
Printed in Canada.

Sound Effects IBM® ONLY

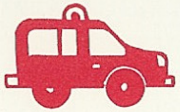
Here's a siren:

```
tone 600 10 tone 1000 10
```

Make it go on and on:

```
repeat 10 [tone 600 10 tone 1000 10]
```

Make an ambulance drive by with its siren wailing!



```
rg
setsh ⌴
rt 90
pu
repeat 10 [fd 5 tone 600 10
           tone 1000 10 wait 20]
```

An ambulance shape.

Here are some sound effects you can use with video games:

```
to beeps :pitch
repeat 10 [tone :pitch 1 wait 1]
end
```

High beeps:

```
beeps 1000
```

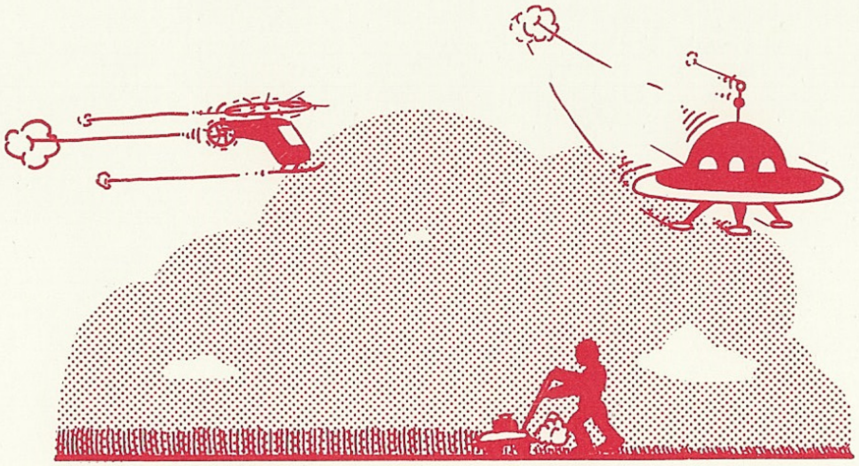
Low beeps:

```
beeps 100
```

An electric motor's hum:

```
tone 60 200
```

Try these ideas



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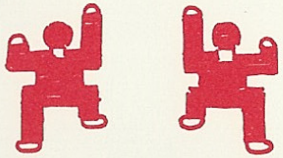
Climbing a Ladder

Make these shapes:



Define a procedure that sets the turtle to one shape, then the other, again and again.

```
to climb
setsh ␣
fd 5
setsh ␣
fd 5
climb
end
```

Use your shape numbers.

Try it:

```
rg
pu
climb
```

STOP Press the **stop** keys to stop climbing.

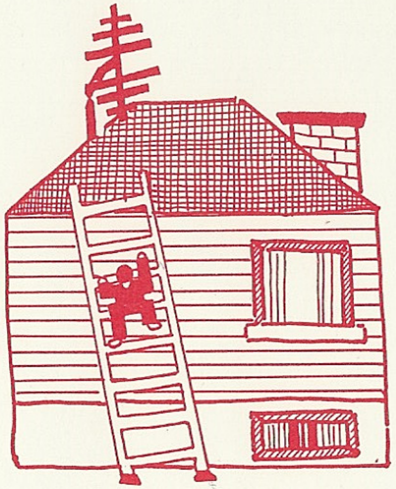
Add **wait** so the person climbs more slowly:

```
to climb
setsh ␣
fd 5
wait 10
setsh ␣
fd 5
wait 10
climb
end
```

Try it again:

```
rg
pu
climb
```

Can you draw a ladder for your climber?



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Sound Effects For use with the COMMODORE 64® computer.

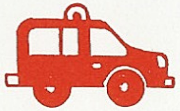
Here's a siren:

```
tone 600 20 tone 1000 20
```

Make it go on and on:

```
repeat 10 [tone 600 20 tone 1000 20]
```

Make an ambulance drive by with its siren wailing!



```
rg
setsh ⌴
rt 90
pu
repeat 10 [fd 5 tone 600 20 tone
          1000 20]
```

An ambulance shape.

Here are some sound effects you can use with video games:

```
to beeps :pitch
repeat 10 [tone :pitch 1]
end
```

High beeps:

```
beeps 1000
```

Low beeps:

```
beeps 100
```

An electric motor's hum:

```
tone 60 200
```

Try these ideas

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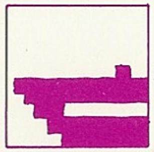
A Talking Clown

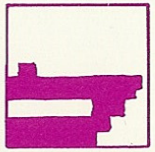
Draw a funny clown face.
Stamp the nose and eyes.
Two turtles will be the mouth.

Make these shapes.
Use shape 3 and shape 4 for the closed-mouth shapes:

shape 3

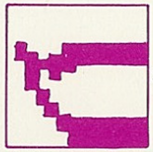


shape 4

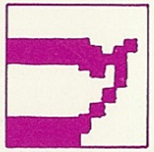


Use shape 5 and shape 6 for the open-mouth shapes:

shape 5



shape 6



Place turtle 1 and turtle 2 where you want the mouth:

```
tell 1
st
setsh 3
```

Press the **turtle-move** keys.

Move turtle 1 with the **arrow** keys.

ESC Press **Escape**.

```
tell 2
st
setsh 4
```

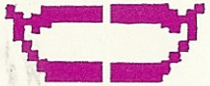
Press the **turtle-move** keys.

Move turtle 2 with the **arrow** keys.

ESC Press **Escape**.

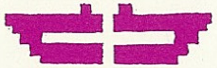
Open the mouth by setting the turtles to the two open-mouth shapes (shape 5 and shape 6):

```
to open
tell 1
setsh 5
tell 2
setsh 6
end
```



Close it with the two closed-mouth shapes (shapes 3 and 4):

```
to close
tell 1
setsh 3
tell 2
setsh 4
end
```

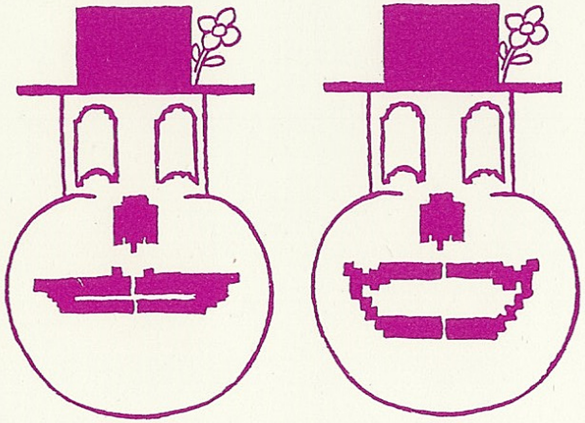


Now make the clown "talk":

```
to talk
open
wait 7
close
wait 3
talk
end
```

Type:

```
talk
```



STOP Press the **stop** keys to stop it.

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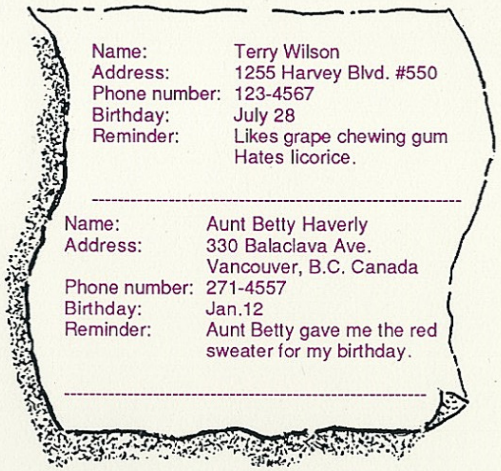
Address Book



Name: Terry Wilson
Address: 1255 Harvey Blvd. #550
Phone number: 123-4567
Birthday: July 28
Reminder: Likes grape chewing gum
Hates licorice.

Name: Aunt Betty Haverly
Address: 330 Balaclava Ave.
Vancouver, B.C. Canada
Phone number: 271-4557
Birthday: Jan.12
Reminder: Aunt Betty gave me the red sweater for my birthday.

Keep a list of addresses, phone numbers and birthdays on a page!

Define a **setup** procedure:

```
to setup
pr [Name:]
pr [Address:]
pr [Phone number:]
pr [Birthday:]
pr [Reminder:]
pr []
pr [------------------]
```

Type:

```
setup
```

Press the **up** keys, and fill in the information.

Press the **down** keys to go back to the command center. If you have a lot of friends to put in your address book, type:

```
repeat ␣ [setup]
```

When you've finished, name the page:

```
namepage "reminders
```

Use any name you like.

Hint: If you have lots of people to keep track of, use one page for people whose names start with A to G, and another page for H to Z.

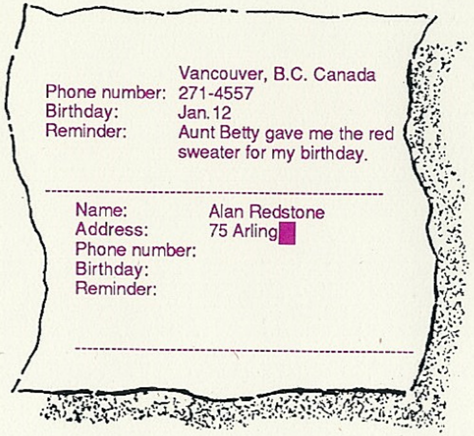
You can add people to your address book any time you want:

Get the reminders page:

```
getpage "reminders
```

Run the **setup** procedure:

```
setup
```



Vancouver, B.C. Canada
Phone number: 271-4557
Birthday: Jan. 12
Reminder: Aunt Betty gave me the red sweater for my birthday.

Name: Alan Redstone
Address: 75 Arling
Phone number:
Birthday:
Reminder:

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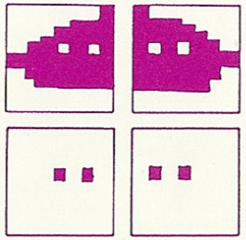
UFO!

Make a spaceship out of four turtle shapes:



Use two for the body of the spaceship.
Leave holes for windows.

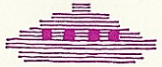
Use two other shapes for the windows.

These procedures assemble the spaceship:

```
to assemble
setshapes
sticktogether
end
```

```
to setshapes
tell 0
setsh ␣          The left-body shape.
tell 1
setsh ␣          The right-body shape.
tell 2
setsh ␣          The left-window shape.
tell 3
setsh ␣          The right-window shape.
tell [0 1]
setc ␣           Choose a color.
end
```

```
to sticktogether
tell all
pu
setpos [0 0]
tell [1 3]
seth 90
fd 20
end
```

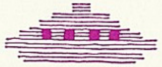


Change the color of the windows to make lights flash inside the spaceship.

These two procedures place the spaceship and make it fly downwards:

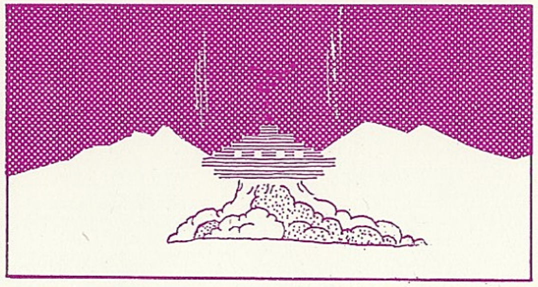
```
to moveup
tell all
seth 180
bk 90
st
end
```

```
to land
tone 40 10
tell all
fd 1
tell [2 3]
setc color + 1
land
end
```



UFO is the superprocedure.

```
to UFO
assemble
moveup
land
end
```



Watch the UFO:

```
UFO
```

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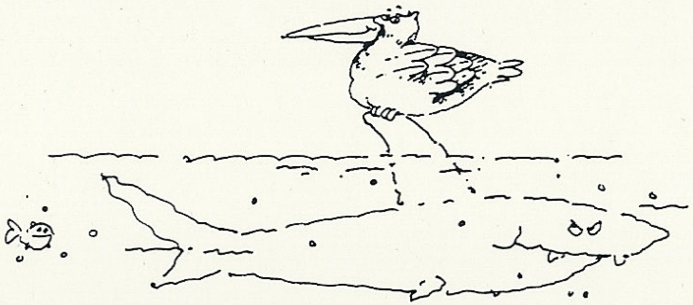
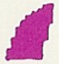
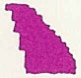
SHARK!

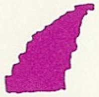


Use larger and larger shapes to create the illusion that a shark fin is getting closer and closer.

Make three shark fin shapes: small, medium, and large.





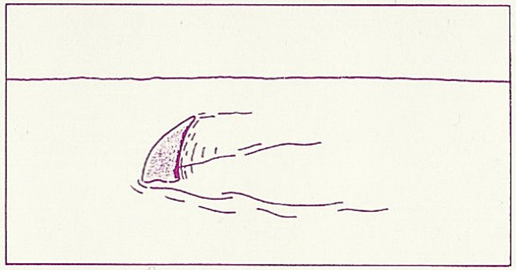


Draw the horizon line:

```
rg
ht
rt 90
fd 350
```

The shark will move smoothly across the screen, and disappear for a little while:

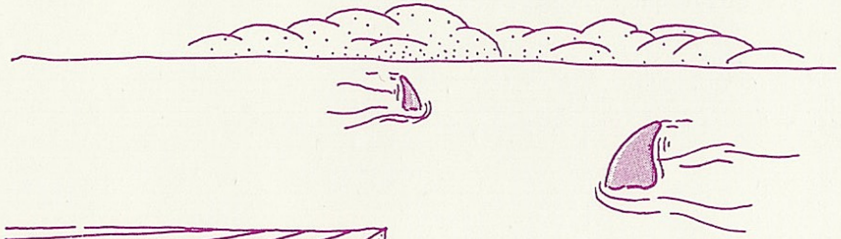
```
to cross
st
repeat 260 [fd 1]
ht
wait 20
end
```

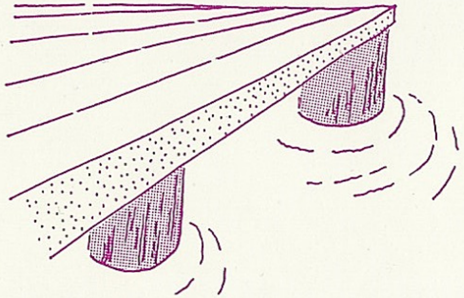


This procedure makes the shark swim back and forth.

```
to swim
pu
fd 130
rt 180
setsh 1
cross
lt 90
fd 30
lt 90
setsh 2
cross
rt 90
fd 30
rt 90
setsh 3
cross
end
```

Can you add a scary soundtrack to the shark's approach?





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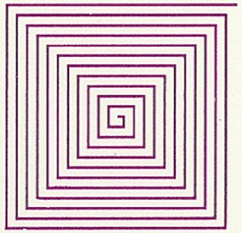
Stop Rules: Spirals

This procedure draws a square spiral:

```
to squarespi :length
fd :length
rt 90
squarespi :length + 5
end
```

Try it:

```
squarespi 5
```



Press the **stop** keys to stop it.

Add a "stop rule" so that **squarespi** will stop by itself.

```
to squarespi :length
if :length > 100 [stop]
fd :length
rt 90
squarespi :length + 5
end
```

This is the stop rule – it says "stop if **length** is greater than 100".

Try it:

```
squarespi 5
```

Make smaller or larger spirals by changing the number in the stop rule.

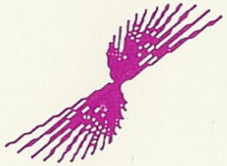
Add an input for the angle:

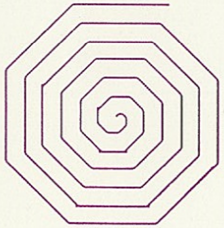
```
to spi :angle :length
if :length > 100 [stop]
fd :length
rt :angle
spi :angle :length + 5
end
```

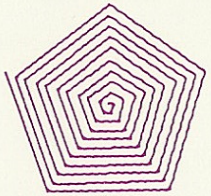
Draw different spirals:

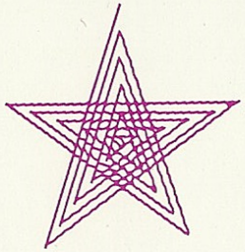
```
spi 123 5
spi 95 5
```

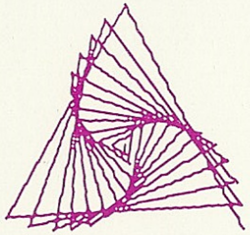
Try these ideas











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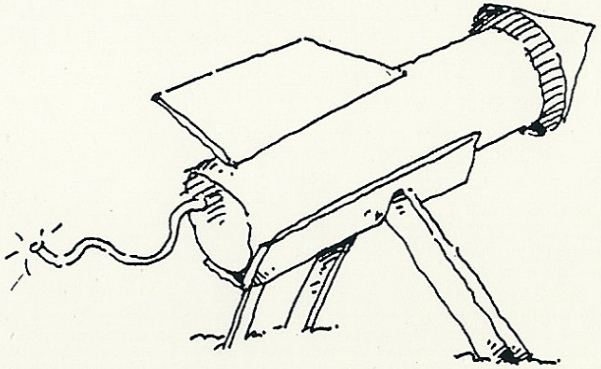
The Countdown



Here's a recursive procedure that subtracts a number each time it runs:

```
to countdown :number
pr :number
countdown :number - 1
end
```

Try:

```
countdown 10
countdown 50
```

STOP Stop it with the **stop** keys.

Add a stop rule so that it stops by itself:

```
to countdown :number
if :number < 0 [stop]
pr :number
countdown :number - 1
end
```

This is the stop rule – it says "stop if the value of **number** is less than zero".

Try:

```
countdown 10
```

Make a "mission control" countdown:
Count once a second.
Beep once every count.
When the count is finished, run **blastoff**.

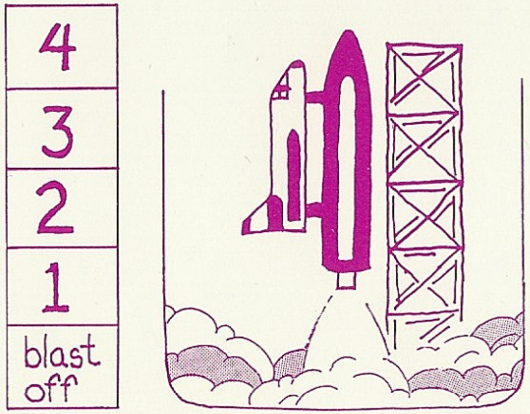
```
to countdown :number
if :number < 0 [blastoff stop]
wait 20
tone 1000 1
pr :number
countdown :number - 1
end
```

```
to blastoff
ct
pr [blast off!]
end
```

Try:

```
countdown 10
```

Make the **blastoff** procedure better – draw a real rocket that takes off.



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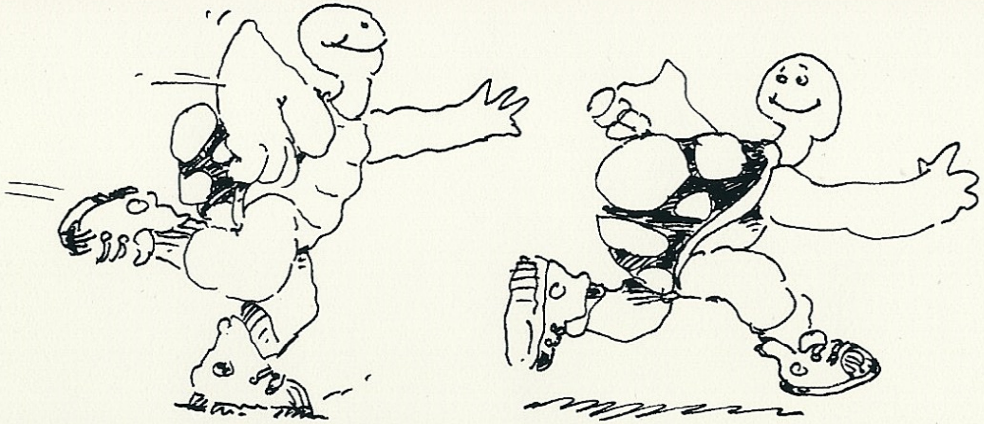
Turtle Tag



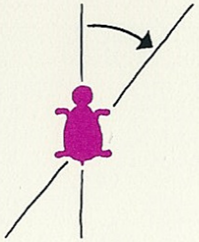
Play tag with two turtles:
With two turtles racing around the screen, try to steer one so it touches the other.

Program two **control** keys to steer your turtle:

```
when "z [tell 1 lt 45]
when "x [tell 1 rt 45]
```

```
tell 1
st
```

Press Control-Z Ctrl-Z and Control-X Ctrl-X to see how the turtle turns.



Define a **race** procedure:

```
to race
tell [0 1]
fd 5
if colorunder = 2 [tone 60 10 stop]
race
end
```

This is how **race** works:

The two turtles keep moving around unless one of them is over color number 2.

Since the background is black, the only thing that's color 2 is the other turtle. That means one is under the other – tag!

Start the game by clearing the screen, turning the **control** keys on, and pointing the turtles in different directions:

```
to startgame
rg
ct
when "z [tell 1 lt 45]
when "x [tell 1 rt 45]
tell [0 1]
st
pu
setc 2
each [rt random 360]
race
end
```

Play the game:

```
startgame
```

Press Control-Z Ctrl-Z and Control-X Ctrl-X to catch the turtle!

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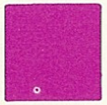
Turtle Squash

Bounce one turtle off another.

Set one turtle to a square "paddle" shape:

```
rg
pu
setsh 11
setc 2
```

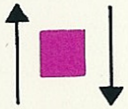


Set another to a ball shape:

```
tell 1
st
setsh 12
pu
```

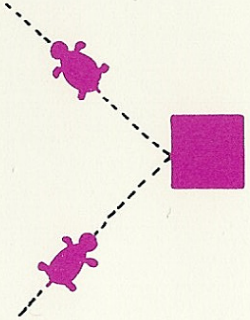
Program two **control** keys to move the paddle-turtle up and down:

```
when "w [tell 0 fd 5]
when "z [tell 0 bk 5]
```



The **bounce** procedure makes a turtle bounce by changing its heading.

```
to bounce
seth -heading
end
```



If the turtle's heading is 45, **bounce** sets it to −45.

Move moves the ball. Every time the ball moves, it checks to see if the color underneath it is color 2.

If the color underneath is 2, **bounce** makes it turn, bouncing off the paddle.

```
to move
tell 1
fd 5
if colorunder = 2 [bounce]
move
end
```

Play the game!

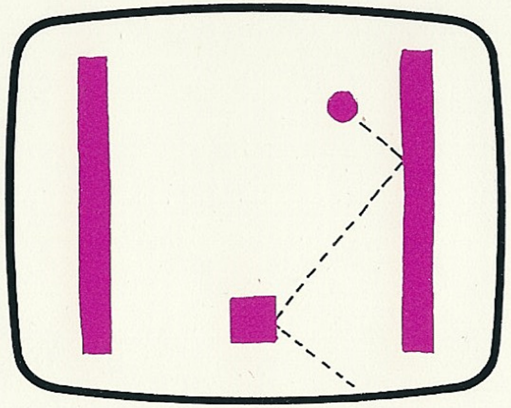
```
tell 1
rt 70
move
```

Press Control-Z Ctrl-Z to move the paddle down.
Press Control-W Ctrl-W to move the paddle up.

Press the **stop** keys to stop the game.

Draw walls at the sides of the page for the turtle to bounce off.

Use the same color as the paddle.



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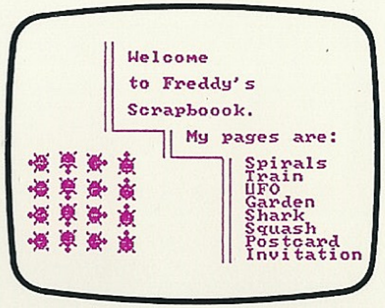
Startup Your Scrapbook

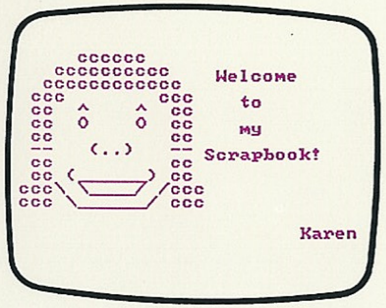
Startup is a special name built into LogoWriter: if you name a page Startup, it automatically opens when LogoWriter starts.

Try it out:

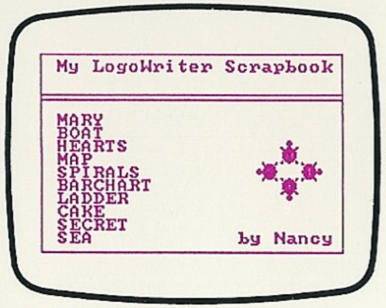
Make a welcome page of your own.



Welcome
to Freddy's
Scrapboook.
My pages are:
Spirals
Train
UFO
Garden
Shark
Squash
Postcard
Invitation



Welcome
to
my
Scrapbook!
Karen



My LogoWriter Scrapbook
MARY
BOAT
HEARTS
MAP
SPIRALS
BARCHART
LADDER
CAKE
SECRET
SEA
by Nancy

Name the page Startup:

```
np "startup
```

ESC Press **Escape** to leave the page.

Now start LogoWriter up again:

If you're using an Apple® computer:

Press ® Control Reset

If you're using an IBM® computer:

Press Ctrl Alt Del

Watch your page automatically open – without going to Contents!

Use Startup:

to automatically start a class presentation, so you don't have to press a single key.

for a program you want to be used by someone who doesn't know LogoWriter.

Define a procedure named **startup** on your page named Startup: When the page opens by itself, the procedure will run by itself!

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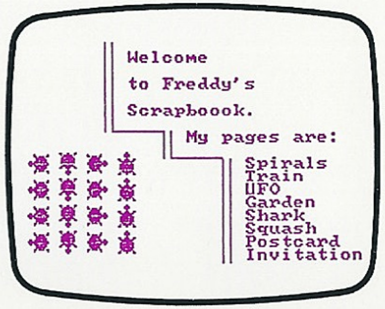
IBM is a registered trademark of International Business Machines Corporation.

Startup Your Scrapbook For use with the COMMODORE 64® computer.

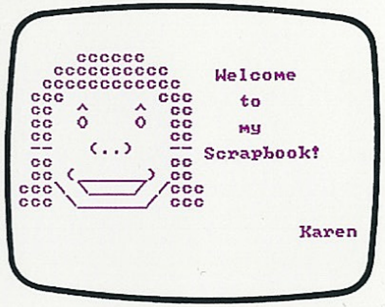
Startup is a special name built into LogoWriter: if you name a page Startup, it automatically opens when LogoWriter starts.

Try it out:

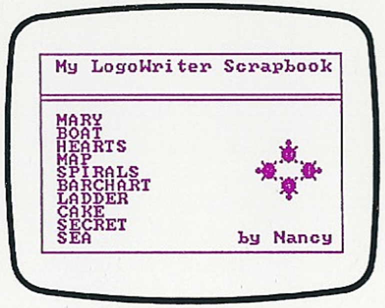
Make a welcome page of your own.



Welcome
to Freddy's
Scrapboook.
My pages are:
Spirals
Train
UFO
Garden
Shark
Squash
Postcard
Invitation



Welcome
to
my
Scrapbook!
Karen



My LogoWriter Scrapbook
MARY
BOAT
HEARTS
MAP
SPIRALS
BARCHART
LADDER
CAKE
SECRET
SEA
by Nancy

Name the page Startup:

```
np "startup
```

ESC Press **Escape** to leave the page.

Try it out.

Turn off the computer, wait a minute, and then turn it on again.

Now start LogoWriter up again.

Watch your page automatically open – without going to Contents!

Use Startup:

to automatically start a class presentation, so you don't have to press a single key.

for a program you want to be used by someone who doesn't know LogoWriter.

Define a procedure named **startup** on your page named Startup: When the page opens by itself, the procedure will run by itself!

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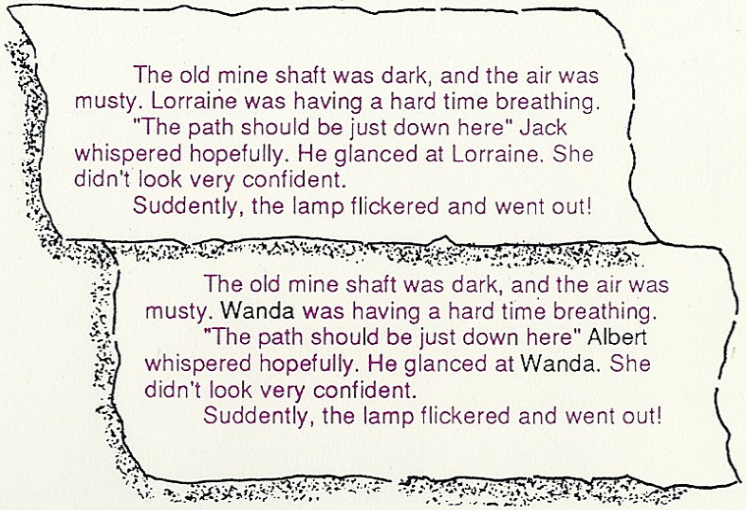
Change Your Mind?

Here's part of a story written with LogoWriter:



The old mine shaft was dark, and the air was musty. Lorraine was having a hard time breathing.

"The path should be just down here" Jack whispered hopefully. He glanced at Lorraine. She didn't look very confident.

Suddenly, the lamp flickered and went out!

The old mine shaft was dark, and the air was musty. Wanda was having a hard time breathing.

"The path should be just down here" Albert whispered hopefully. He glanced at Wanda. She didn't look very confident.

Suddenly, the lamp flickered and went out!

How would you change the names of the heroes?

You could go up and change them one by one, but if the story is long, that would be a lot of work.

Here's a procedure that replaces one word with another. It uses one subprocedure:

```
to change :old :new
top
changeall :old :new
end
```

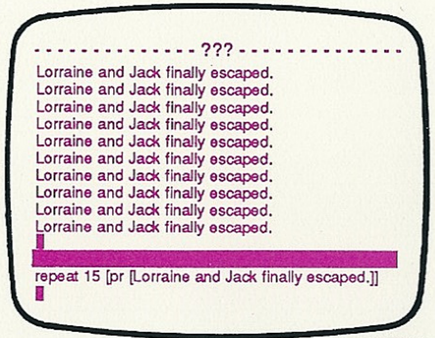
```
to changeall :old :new
replace :old :new
if not found? [stop]
changeall :old :new
end
```

This is the stop rule – it says "stop if the old word was not found".

The recursion line in **changeall** keeps on replacing the old word with the new one until it stops.

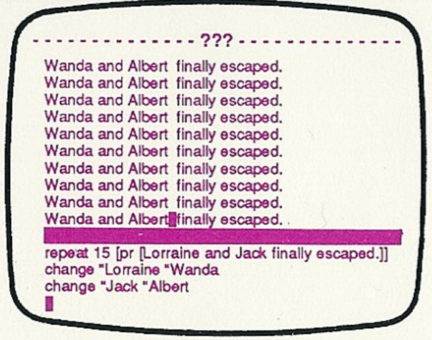
Change and **changeall** find every single occurrence of a word on the page, and change it. Try it:

```
ct
ht
repeat 15 [print [Lorraine and Jack
finally escaped.]]
change "Lorraine "Wanda
change "Jack "Albert
```



```
--------------???--------------
Lorraine and Jack finally escaped.
Lorraine and Jack finally escaped.
Lorraine and Jack finally escaped.
Lorraine and Jack finally escaped.
Lorraine and Jack finally escaped.
Lorraine and Jack finally escaped.
Lorraine and Jack finally escaped.
Lorraine and Jack finally escaped.
Lorraine and Jack finally escaped.
Lorraine and Jack finally escaped.

repeat 15 [pr [Lorraine and Jack finally escaped.]]
```



```
--------------???--------------
Wanda and Albert finally escaped.
Wanda and Albert finally escaped.
Wanda and Albert finally escaped.
Wanda and Albert finally escaped.
Wanda and Albert finally escaped.
Wanda and Albert finally escaped.
Wanda and Albert finally escaped.
Wanda and Albert finally escaped.
Wanda and Albert finally escaped.
Wanda and Albert finally escaped.

repeat 15 [pr [Lorraine and Jack finally escaped.]]
change "Lorraine "Wanda
change "Jack "Albert
```

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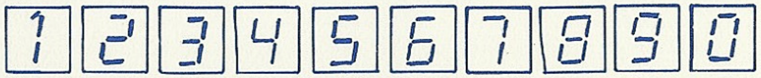
Digital Counter

This digital counter uses shapes for the display.

Go to the shapes page and make shapes 1 through 10 into numbers:
Shape 1 will be the number 1.
Shape 2 will be the number 2.
Shape 3 will be the number 3.



Shape 10 will be the number 0.

To count through the numbers, type:

```
rg
setsh 1
repeat 9 [setsh shape + 1]
```

Define a procedure using **wait** to slow it down:

```
to counter
setsh shape + 1
wait 10
counter
end
```

Counter uses recursion to run again and again.

Try it:

```
setsh 0
counter
```

STOP Press the **stop** keys to stop it.

It works but doesn't stop at shape 10. An **ifelse** instruction can decide whether to set the shape higher or go back to shape 1. Add the **ifelse** line to **counter**:

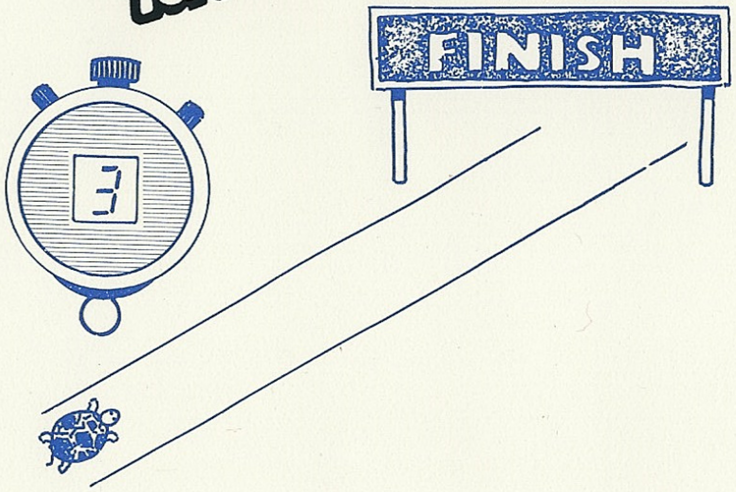
```
to counter
ifelse shape = 10
     [setsh 1]
     [setsh shape + 1]
wait 20
counter
end
```

If the shape is shape 10, reset it to shape 1.
If the shape isn't shape 10, set it to the next shape higher.

Try it. It will count from 0 to 9 forever:

```
setsh 0
counter
```

Try these ideas



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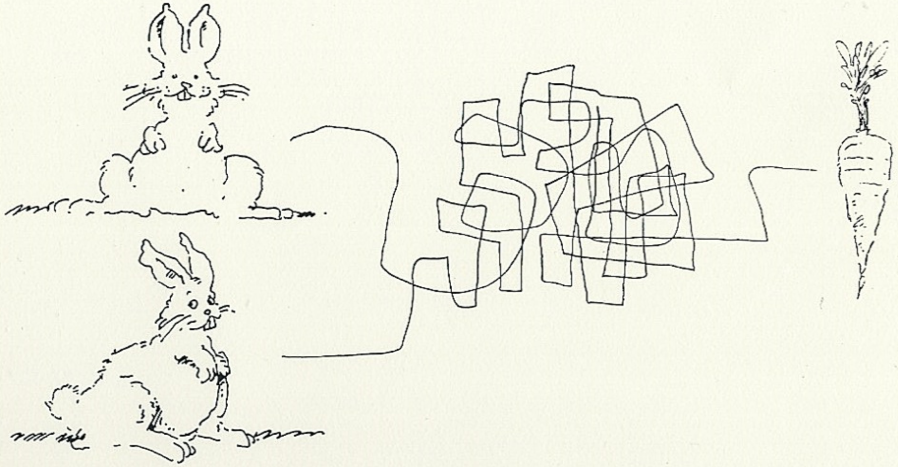
Turtle Doodling



Readchar tells LogoWriter which key has been pressed on the keyboard.

Make doodle-drawings by moving the turtle around with four keys.

```
to doodle
name readchar "key
if :key = "f [fd 2]
if :key = "b [bk 2]
if :key = "r [rt 5]
if :key = "l [lt 5]
if :key = "s [stop]
doodle
end
```

Each time you press **f**, the turtle goes forward 2 steps.

Each time you press **b**, the turtle goes back 2 steps.

Each time you press **r**, the turtle turns 5 degrees to the right.

Each time you press **l**, the turtle turns 5 degrees to the left.

If you press **s**, **doodle** stops.

Try it out:

`doodle`

Now doodle some more!

Try these ideas

Good-bye

Eric

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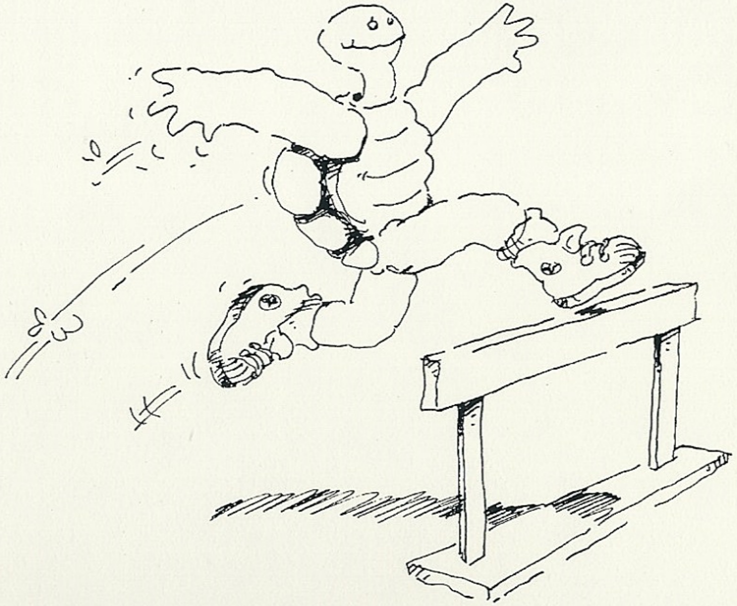
Hopping Turtle



Make a hopping turtle target game: press a key and the turtle hops!

Make a target for the turtle to hop onto:

You could draw a shape and fill it.
Or use another turtle as the target.

Define the **hop** procedure, using **readchar** to read the key pressed:

```
to hop
name readchar "jump
if :jump = "k [rt 15]
if :jump = "j [lt 15]
if :jump = "m [go 10]
if colorunder = ␣
   [pr [Made it!] stop]
hop
end
```

The color of your target.

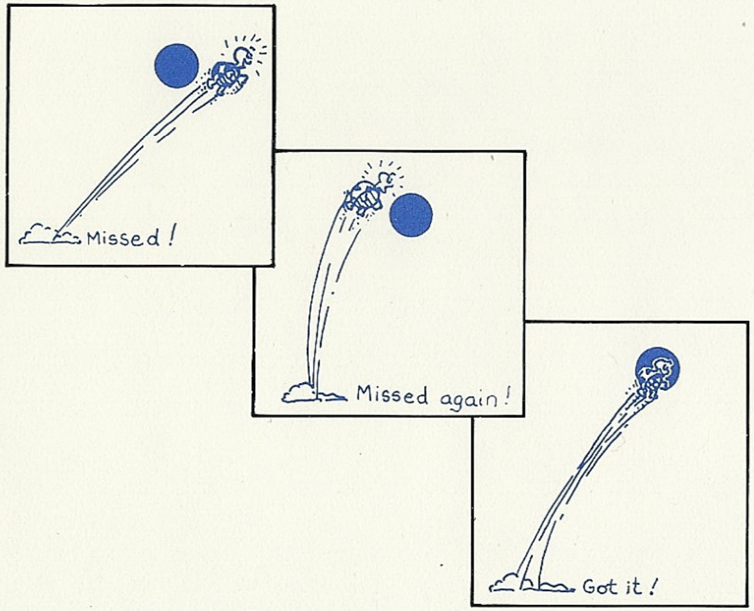
The hopping movement is done by the **go** procedure. It's recursive: the turtle actually goes forward lots of times in one hop. The amount the turtle goes forward gets smaller each time:

```
to go :speed
if :speed = 0 [stop]
fd :speed
go :speed - 1
end
```

Play the game:

```
pu
hop
```

Press **j** and **k** to turn the turtle, and **m** to make it hop.


Missed!
Missed again!
Got it!

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Guess a Number

click
click

Play a number game with the computer.
LogoWriter will choose a number.
See how many guesses it takes to find the number.

Here's a procedure which chooses a number:

```
to choose
name random 10 "number
end
```

The value of **number** is always less than 10. Every time **choose** runs, it picks a number at random: maybe a different number, maybe the same one. Try it:

```
choose
pr :number
choose
pr :number
```

Here's a procedure that lets you type in your guess. Once you've guessed, it compares your guess to the value of **number**.

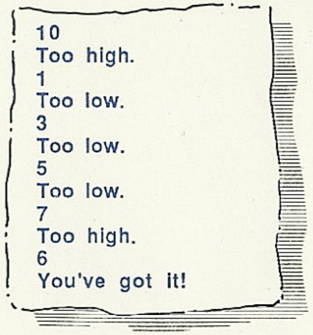
```
to guessnumber
name readchar "guess
pr :guess
if :guess > :number
   [pr [Too high.]]
if :guess < :number
   [pr [Too low.]]
if :guess = :number
   [pr [You've got it!] stop]
guessnumber
end
```

Numbergame is the superprocedure that sets up the game, and runs the subprocedures.

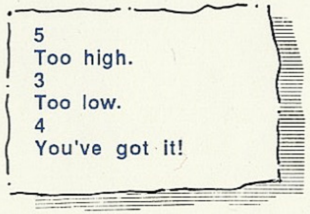
```
to numbergame
ct
pr [I'm thinking of a number that's
   less than 10]
pr [Can you guess what it is?]
choose
guessnumber
end
```

Play the game a few times.

Can you find a way to get the number in 4 tries or less?



```
10
Too high.
1
Too low.
3
Too low.
5
Too low.
7
Too high.
6
You've got it!
```



```
5
Too high.
3
Too low.
4
You've got it!
```

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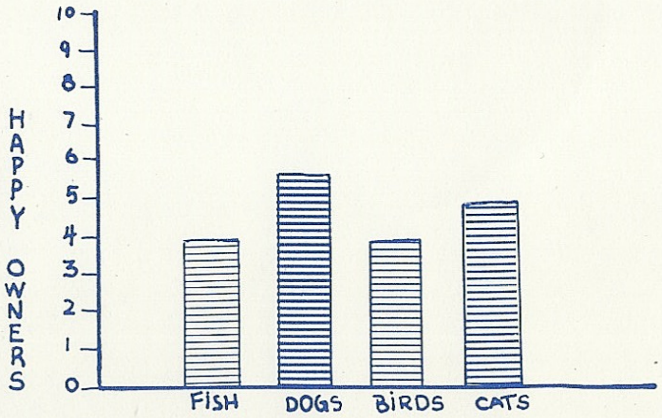
Bar Charts



A bar chart can be made with lines and filled rectangles.

Define a procedure to make rectangles:

```
to rect :side1 :side2
repeat 2
   [fd :side1 rt 90 fd :side2 rt 90]
end
```

Define a **bar** procedure with an input, for the length of the bar:

```
to bar :length
pd
rect :length 10
pu
rt 45
fd 5
pd
fill
pu
bk 5
lt 45
end
```

Try it out:

```
rg
bar 80
cg
setc 2
bar 10
```

Now draw a bar chart. The length of each bar can represent:

- something personal, like the hours you spend using a computer each week.
- part of a class project, like the populations of different countries.

Draw the lines:

```
rg
fd 70
bk 70
rt 90
fd 110
bk 110
```

Draw the bars:

```
fd 10
lt 90
bar 60
rt 90
fd 20
lt 90
bar 40
```

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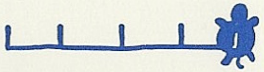
Cartesian Grid

Make a grid for plotting graphs. This kind of grid can represent positive **and** negative numbers.

Draw marks on the horizontal line. Start by drawing to the right:

```
setpos [0 0] fd 5 bk 5
setpos [10 0] fd 5 bk 5
setpos [20 0] fd 5 bk 5
setpos [30 0] fd 5 bk 5
```

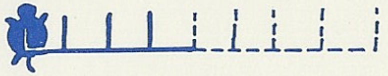
...and so on, adding 10 to the first **setpos** number each time.



Now draw to the left. *Subtract* 10 each time:

```
setpos [-10 0] fd 5 bk 5
setpos [-20 0] fd 5 bk 5
setpos [-30 0] fd 5 bk 5
```

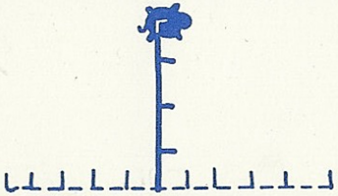
...and so on.



For the vertical line, turn the turtle, and add 10 to the *second* setpos number each time:

```
home
rt 90
setpos [0 10] fd 5 bk 5
setpos [0 20] fd 5 bk 5
setpos [0 30] fd 5 bk 5
```

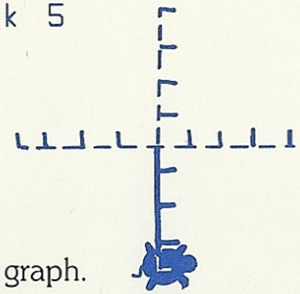
...and so on.



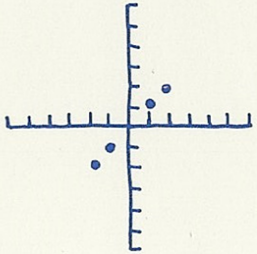
To draw downwards, subtract 10 each time:

```
setpos [0 -10] fd 5 bk 5
setpos [0 -20] fd 5 bk 5
setpos [0 -30] fd 5 bk 5
```

...and so on.



Use the **dot** procedure to make a dot graph.



```
to dot :pos
pu
setpos :pos
pd
fd 0
pu
end
```

Try:

```
dot [-30 -30]
dot [-20 -20]
dot [20 20]
dot [30 30]
```

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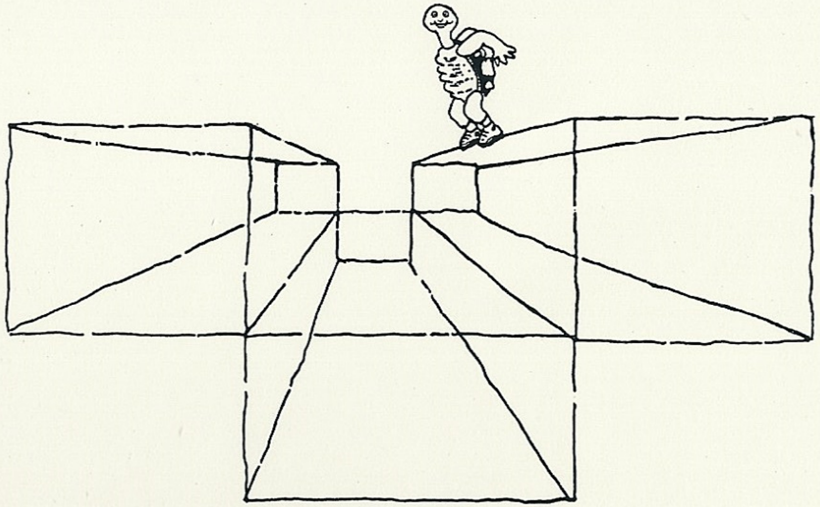
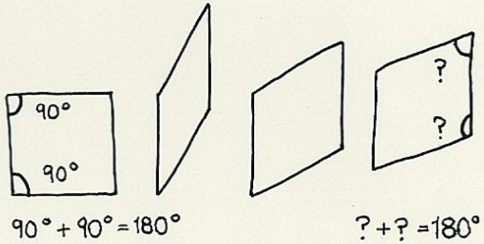


A trapezoid is a four sided shape with parallel sides. Squares and rectangles are trapezoids. So are many other shapes:



LogoWriter can do the arithmetic to draw trapezoids:

```
to trapezoid :angle
repeat 2
   [fd 40 rt :angle fd 40
   rt 180 -  :angle]
end
```

If **:angle** is 30, the other angle is 150 (180 − 30).

Try **trapezoid** with different inputs.

```
rg
trapezoid 30
cg
trapezoid 70
```

Here's a procedure which uses **trapezoid** to create the illusion of depth:

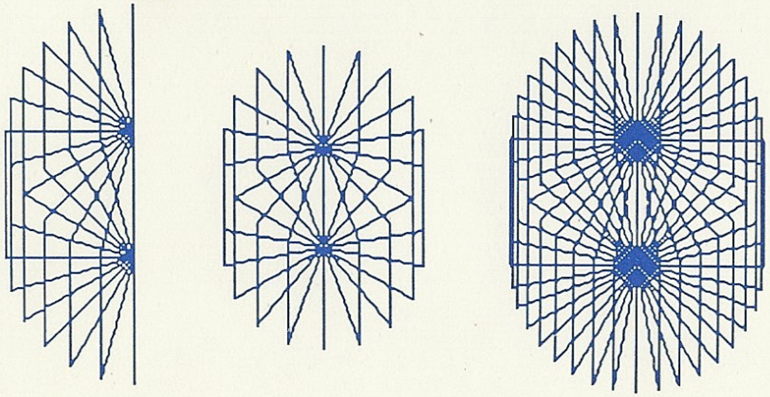
```
to 3d :angle
if :angle > 360 [stop]
trapezoid :angle
3d :angle + 10
end
```

The stop rule: if **angle** is greater than 360 degrees, stop.

Watch it draw:

```
3d 0
```

Try these ideas



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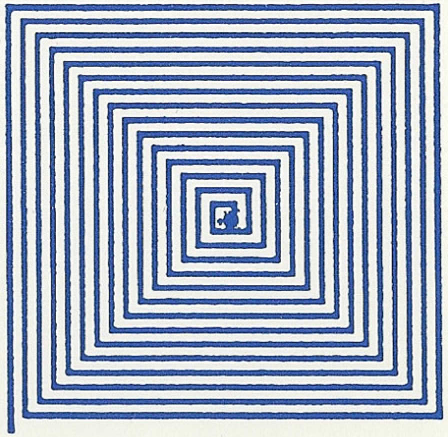
Spiral In



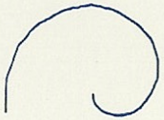
Draw a spiral that curls in.

The length of the side gets smaller each time:

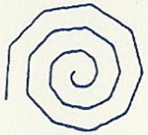
```
to spiralin :length :angle
if :length = 0 [stop]
fd :length
rt :angle
spiralin :length - 1 :angle
end
```

Try a few spirals:

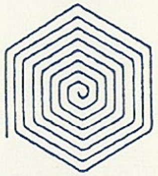
```
rg
spiralin 20 20
```



```
cg
spiralin 30 40
```



```
cg
spiralin 80 60
```

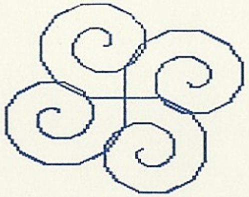


Tell all four turtles to spiral at once:

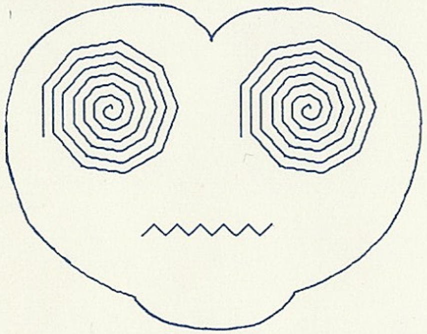
```
to allspi :length :angle
tell all
ht
pu
setpos [0 0]
each [rt 90 * who]
pd
spiralin :length :angle
end
```

Watch the spiral patterns:

```
rg
allspi 25 30
rg
allspi 80 90
```



Try these ideas



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Beyond Polygons

Here's a procedure which can draw polygons.

```
to polyspi :length :angle
poly2 :length :angle heading
end
```

Poly2 is the subprocedure. It uses recursion to draw the shapes.

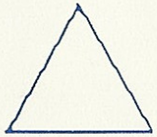
```
to poly2 :length :angle :direction
fd :length
rt :angle
if heading = :direction [stop]
poly2 :length :angle :direction
end
```

The turtle's heading is used for the stop rule. When its heading is equal to the heading it started with, **poly2** stops.

You can draw squares and triangles:

```
rg
polyspi 70 90
```

```
cg
polyspi 80 120
```



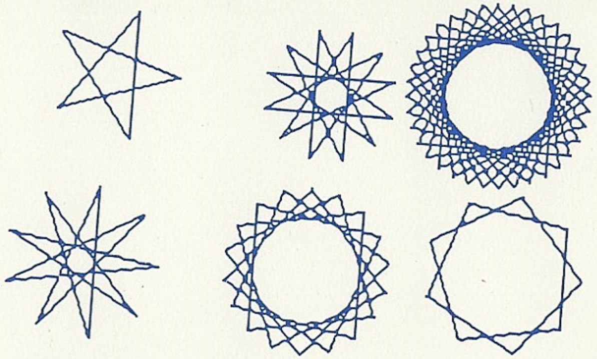
Try different numbers for more complex shapes:

```
polyspi 60 80
polyspi 80 100
polyspi 90 160
polyspi 90 185
```

Add a line to **poly2** to change the turtle's color for each side:

```
to poly2 :length :angle :direction
setc color + 1        The new line.
fd :length
rt :angle
if heading = :direction [stop]
poly2 :length :angle :direction
end
```

Try these ideas



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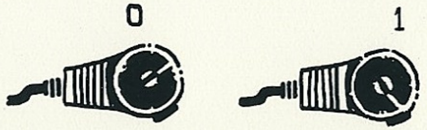
Bumper Turtles APPLE® ONLY

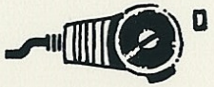
Use two game paddles to play a bumper game with two turtles!



LogoWriter can be programmed to use game paddles. **Paddle** looks to see what position the paddles are in.

Plug in a pair of paddles. One is paddle 0; the other is paddle 1 (on some paddles they are labeled 0 and 1, if not, you'll have to experiment to see which is which).

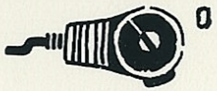
Turn paddle 0 to the right, then type:



```
show paddle 0
```

⎵ A number is printed in the command center.

Turn it to the left:



```
show paddle 0
```

⎵ The number is smaller.

The **follow** procedure uses the numbers from paddle 0 and paddle 1.
Paddle 0 controls turtle 0 and paddle 1 controls turtle 1.
Follow uses a "trick": it multiplies the numbers from the paddles by 1.4. That lets you turn the turtle the full way around, from heading 0 to heading 359.

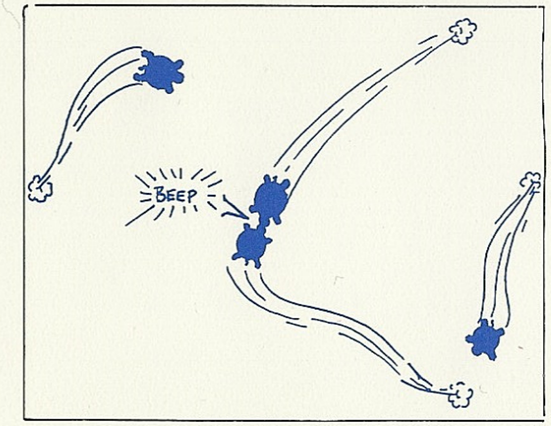
```
to follow
tell 0
seth 1.4 * paddle 0
fd 4
tell 1
seth 1.4 * paddle 1
fd 4
if colorunder = 2 [tone 60 10]
follow
end
```

```
to start
tell [0 1]
st
setc 2
pu
follow
end
```

Got two players and two paddles all set?

Play bumper turtle!

```
start
```



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